



GA
61
03A2

Cornell University Library	
THE GIFT OF	
Ohio Geological Survey	
A.185944	8/3/1905.

The date shows when this volume was taken.

All books not in use for instruction or research are limited to all borrowers.

Volumes of periodicals and of pamphlets comprise so many subjects, that they are held in the library as much as possible. For special purposes they are given out for a limited time.

Graduates and seniors are allowed five volumes for two weeks. Other students may have two vols. from the circulating library for two weeks.

Books not needed during recess periods should be returned to the library, or arrangements made for their return during borrower's absence, if wanted.

Books needed by more than one person are held on the reserve list.

Books of special value and gift books, when the giver wishes it, are not allowed to circulate.

Cornell University Library

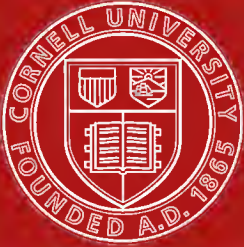
GA61.O3 A2

Preliminary report on the Ohio Co-operat



3 1924 029 995 994

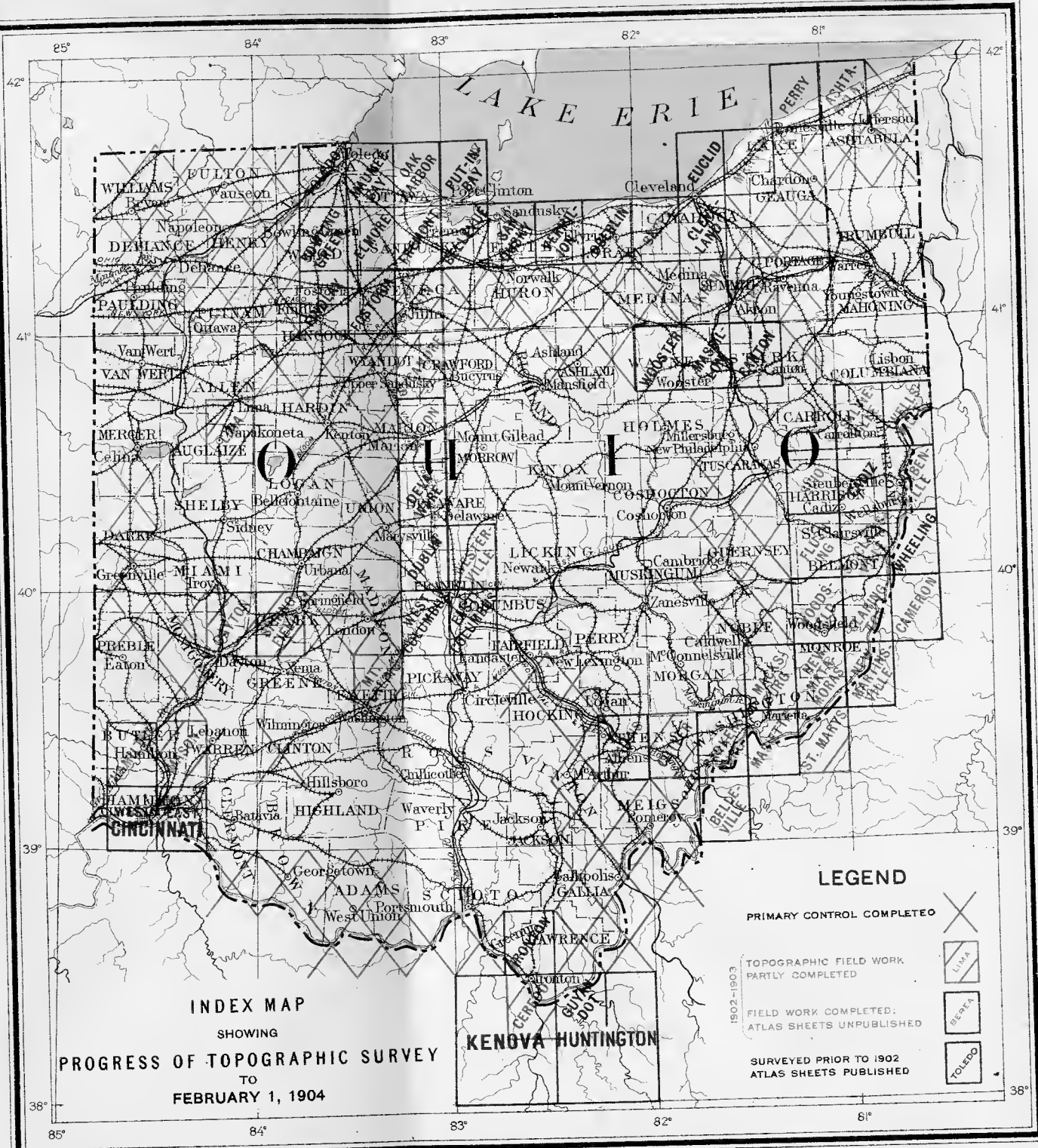
olin



Cornell University Library

The original of this book is in
the Cornell University Library.

There are no known copyright restrictions in
the United States on the use of the text.



PRELIMINARY REPORT

ON THE

OHIO

CO-OPERATIVE

TOPOGRAPHIC SURVEY

November 15, 1903.

C. E. SHERMAN, Inspector.



Springfield, Ohio:
The Springfield Publishing Company,
State Printers.
1904.

~~Report~~

A. 12597-1

Advertisement

This report is printed by the State for gratuitous distribution. To obtain a copy, apply first to the local representative in the State legislature. Failing there, application should be made to the Secretary of State, in accordance with the law as laid down in Senate Joint Resolution No. 15, a copy of which is given in Appendix A of this report.

The maps of the Survey are sold by the Federal authorities for five cents a sheet. Each sheet is designated by the name of the principal feature on it, usually a town, and the purchaser should call for the sheets by these names. Send postoffice money order—not stamps—addressed to the Director, U. S. Geological Survey, Washington, D. C. If one hundred copies of a sheet, or of different sheets, are ordered at one time, the price is two cents per copy.

LETTER OF TRANSMITTAL.

COLUMBUS, OHIO, December 23, 1903.

Hon. George K. Nash, Governor of Ohio:

SIR:—As your representative, appointed by Your Excellency, May 12, 1902, to inspect the work of the Co-operative Topographic Survey of this State, I have the honor to submit the following report covering the work of the Survey from its inception to November 15, 1903. Accompanying the report is a map showing the progress of the Survey from its inception. Also copies of the twenty-eight sheets thus far engraved, are herewith presented. Eight appendices are also submitted, four of which give the results of primary triangulation, primary traverse, spirit leveling, and meridian marks established by the Survey.

As these data will be of immediate use to the surveyors and engineers of the State, as well as to all those who make use of surveys, it is recommended that they be printed as soon as practicable.

Much of this information was furnished through the courtesy of Mr. H. M. Wilson of the United States Geological Survey.

Very respectfully,

C. E. SHERMAN.

COLUMBUS, O., May 16, 1904.

HON. MYRON T. HERRICK, *Governor of Ohio*:

DEAR SIR:—Since no provision for printing Co-operative Topographic Survey reports was made by the State law which provides for the printing of the reports of other State officials, a special enactment—Senate Joint Resolution No. 15—had to be procured for publishing this work. The result has been a delay in getting the work to the printer, and this delay has been taken advantage of to include in the report all the latest adjustments of the precise leveling done during 1903. The last of these was completed April 9th, last.

Very respectfully,

C. E. SHERMAN.

CONTENTS.

	PAGE.
Introductory	7
Legislation and Agreements.....	9
Expenditures	11
Record of Progress	14
Work done prior to legislation.....	14
Season of 1900	16
Season of 1901	17
Season of 1902	19
Season of 1903	21
Summary of results to November 15, 1903.....	23
Uses of Topographic Maps.....	24
Method of Surveying and Mapping.....	27
Inspection	35
Recommendations	38
Appendices—	
A—Legislative Acts. Agreements.....	41
B—Expenditures on Quadrangles.....	45
C—Topographic Maps Engraved. In Process of Engraving, Sur- veyed, and Partly Surveyed.....	51
D—List of Primary Triangulation Stations.....	55
E—List of Geographic Positions from Primary Traverse.....	105
F—List of Permanent Bench Marks.....	181
G—List of Meridians Established.....	221
H—Organization and Personnel of Survey.....	227

INTRODUCTORY.

A decade ago, the citizens of Ohio began agitation for a survey and map of the State upon a larger scale and to more accurate detail than existing maps. Indeed no authoritative survey or map of the State existed, or yet exists, upon which to project cadastral surveys, lay out industrial projects, or use for detailed educational, engineering, or scientific purposes. Several small-scale maps exist, the best of which is that of Warner and Foote made twenty years ago, to a scale of four miles to the inch. This map, however, like its predecessors is a compilation from such data as could then be gathered, no extensive and careful survey being made to check the data used; hence, although very valuable for general purposes, it is inaccurate and published to too small a scale to meet the numerous calls now made for detailed information.

The States of Massachusetts, New Jersey, Rhode Island and Connecticut have completed accurate surveys of their domains, from which maps have been made showing not only the features delineated in maps as we ordinarily know them in old style geographies and charts, but also showing the relief—that is, the shapes of the hills and hollows—by the ingenious yet very simple device of *contour lines*. A contour line on a map is a line connecting points that have the same elevation. The shore line of a lake or pond is a contour line, and if the water were to rise five feet a new shore line would be formed which would correspond to another contour line, and the *contour interval* in this case would be five feet. The contour lines on a map may thus be regarded as a series of shore lines, and it is customary to reference them all to sea level; that is, the sea shore is called the zero contour line. If the level of the ocean were to rise 700 feet its shore line would pass through Ohio and the mapped line would be numbered the 700 foot contour. The shore line of Lake Erie is the 573 foot contour. It is customary, however, for convenience to show only lines varying by intervals of twenty feet from the zero line. They are numbered at frequent intervals and every fifth contour is made slightly heavier, to facilitate the reading of the map.

In the four States already mentioned, these contour topographic maps have been found extremely useful. They were all obtained by co-operating with the United States Geological Survey, a bureau of the Department of the Interior. The Geological Survey, through its topographic branch, began in 1882, the task of surveying and mapping the entire United States, making use of such surveys of required accuracy as have already been

made, as for example, the work of the United States Coast and Geodetic Survey and of the United States Lake Survey. From 1884 to 1887 in co-operation with the State of Massachusetts it surveyed and mapped its whole area to a scale of about 1 inch per mile. The total cost of this work was \$107,845 or \$12.90 per square mile, excluding the cost of primary control which had previously been executed by the United States Coast and Geodetic Survey. Of the total cost Massachusetts contributed over \$40,000. In 1884, New Jersey, which had been carrying on a survey under State supervision, applied for co-operation which was agreed to, and the work completed in 1887. The total cost was \$54,744.58, or \$6.93 per square mile, excluding again primary control. Rhode Island was surveyed in 1888 by the Geological Survey in co-operation with the State, the total cost being \$9,732.51, or about \$8.97 per square mile. The co-operative survey of Connecticut was commenced in 1889 and finished in 1891, at an average total cost of about \$9.79 per square mile. In all these States the national survey had borne one-half or more of the expense of surveying and mapping, and the entire expense of engraving and printing the maps.

The assistance of the United States Geological Survey has been offered on such advantageous terms, and the resulting extremely useful maps have been so handsomely engraved and printed by the Survey that other states have in rapid succession, followed the example of the four above mentioned, and numerous state co-operative surveys are now in progress. In response to inquiries made by those interested, the Geological Survey promised co-operation with Ohio upon terms similar to those granted other states; namely, agreeing to pay half the expense of field and office work, and to bear the whole expense of engraving and printing the resulting maps, the publication scale of the maps to be approximately one inch to the mile. The Geological Survey through its representative, Mr. H. M. Wilson, estimated the cost of surveying and mapping at about \$10 per square mile, or for the whole State about \$400,000, of which Ohio was to pay \$200,000. He suggested that the funds could be most economically expended and the work most efficiently carried on, if \$25,000 were appropriated for each year. To this sum the Government would add \$25,000 making \$50,000 available each season, and requiring eight years for the completion of the work.

LEGISLATION.

In response to these representations, and to the urgent requests made by citizens of the State, especially those interested in scientific, engineering, industrial, and educational enterprises, the legislature on April 16, 1900, enacted a law providing for a contour topographic survey and map of the State to be made in co-operation with the United States Geological Survey, and appropriated therefor the sum of \$25,000 with which to carry on the work during the year ending February 15, 1902. By this act the Governor was authorized to arrange with the Director of the National Survey for the details of executing the work, including scale of the map; order in which different parts of State should be surveyed, etc., etc.; and was empowered to accept or reject the work to be done by the Geological Survey. The law provided that the resulting map should accurately show the outlines of all townships, counties, and extensive wooded areas in the State as existing on the ground at the time of the survey; the location of all roads, railroads, streams, canals, lakes, and rivers; and should show by contour lines the elevations and depressions of the surface of the country. The law further stipulated that the State was to pay not to exceed one-half of the total cost of the survey, payments to be made upon vouchers approved by the Governor.

In accordance with the provisions of this act, Your Excellency in November, 1900, entered into an agreement with the Director of the United States Geological Survey for carrying on the work for the year for which the appropriation was made. A copy of this agreement is given in Appendix A. It was made for the work of one year only, and has been made anew for each succeeding year, the provisions being substantially the same, with the exception of a few minor details. The agreements for the seasons of 1902 and 1903 provide for the showing of section lines and section numbering on the maps and for printing 10 foot contours on the maps of the flatter portion of the State, in addition to those features provided for in the first agreement. The agreements have also been practically the same as those under which the National Survey is carrying on co-operative surveys in other States.

The chief provisions of the first agreement were as follows: The Director of the United States Geological Survey to determine the methods of making survey and map and to determine the scale of the preliminary field maps; by tacit agreement not stated in the document, the director was also to have charge of selection and employment of all assistants, selecting

unskilled assistants as far as practicable from the locality in which survey was made; the Governor of Ohio, to determine the order of priority in which different portions of the State were to be surveyed, and to have the right to terminate the contract at any time he deemed the work not being satisfactorily done; the resulting map to be published to a scale of 1:62,500, to be based for primary control on the United States Coast and Geodetic Survey and United States Lake Survey triangulation, supplemented where deficient by the United States Geological Survey which shall permanently monument all important points; the published map to show hydrography, public culture, all town and county boundaries, and township land lines, and hypsography by contour lines at a vertical interval of twenty feet; the Governor to be furnished the heights of important points, and proofs of the engraved map with outlines of wooded areas shown thereon; free access to be afforded to the Governor, or his representative, to the field sheets and records of the topographers and draftsmen during the progress of the work; the resulting map to fully recognize the co-operation of the State, and upon completion of the work, the Governor to be furnished, if desired, with transfers from the engraved copper plates; and finally, the United States Geological Survey to expend an amount equal to that spent by Ohio on the survey.

Copies of the acts making appropriations will be found in Appendix A.

EXPENDITURES.

The legislature by enactments of April 16, 1900, and of May 12, 1902, has thus far appropriated \$75,000 for carrying on the Survey work. Of this amount, \$368.53 lapsed back into the State treasury April 16, 1902, by non-expenditure. This was due to the illness and death of your representative, Prof. C. N. Brown, which brought the work on the part of the State to a standstill for the month or two preceding the close of the appropriation year. Of the remaining amount, \$65,822.36 has been expended for survey work, and a balance of \$8,809.11 remains unexpended November 15, 1903. This last amount will be needed to help pay outstanding accounts for field work still in progress; for such share of the office expense of drafting the sheets surveyed during the past season as will equalize expenditures on the part of both State and Federal government; and for estimated expenses of inspection until the end of the appropriation year, which includes expenses for stenographer and clerk hire for making annual report, for stationery, etc., which will not exceed \$600 in all.

I desire to call attention to the fact that the United States Geological Survey, which has charge of the expenditure of practically all funds and of the employment of help, has paid the bulk of the money—appropriated by both State and Federal governments—to the citizens of the State for subsistence, livery hire, services, and other sundry expenses connected with the survey. This will likewise be true of the remaining appropriations, necessary to complete the map, and since every portion of the State will be surveyed, the distribution of funds will be as nearly uniform as will be possible to make them. Thus the money appropriated by the people through its legislature will all be returned to them, and will cause an additional sum from the National treasury to be likewise distributed within the boundaries of our commonwealth.

All expenditures by the State for survey work have been made upon vouchers furnished by the United States Geological Survey. The employees of the Survey, in charge of parties, pay field expenses of same from their own pockets, filing vouchers and sub-vouchers for such expenses bimonthly at the Washington office. These are there checked, one-half paid by the Federal survey and one-half forwarded to the State. Those forwarded have all been carefully examined by myself, forwarded to Your Excellency, and upon your approval have been paid out of the State treasury upon warrants issued by the Auditor. Since these expense accounts, amounting sometimes to \$1,000 per month for one topographer,

are met by the Government employees out of their own funds, and it would embarrass the work if they were unnecessarily delayed, the vouchers for the same have been forwarded to you during the progress of the survey as promptly as received, and accompanying each, a statement showing the nature of the expense, and the amount remaining in the State fund after the payment of the accounts.

A statement of these expenditures by seasons follows. The State appropriations are available one and two years from the date of adjournment of the legislature. This is usually early in the spring about the time field work can begin, hence the appropriation year coincides approximately with the summarization periods used below.

SEASON OF 1901.

(April 16, 1901, to April 16, 1902.)

RECEIPTS.

Appropriated by legislature April 16, 1900.....	\$25,000 00
Amount lapsed by non-expenditure April 16, 1902.....	368 53
Total amount available for the season.....	<u>\$24,631 47</u>

EXPENDITURES.

Field work of surveying, April 16, 1901, to November 15, 1901.....	\$23,887 48
Office work of drafting.....	143 99
Inspection on part of State, August, 1901, to February, 1902, inclusive. .	600 00
Total.....	<u>\$24,631 47</u>

SEASON OF 1902.

(April 16, 1902, to February 15, 1903.)

RECEIPTS.

Appropriated by legislature May 12, 1902.....	\$20,000 00
---	-------------

EXPENDITURES.

Field work for surveying, Apr. 16, 1902, to Dec. 1, 1902.....	\$16,188 15
Office work of drafting, May, 1902, Jan. and Feb., 1903.....	227 69
Expenses of inspection on part of the State, May 12, 1902, to Feb. 15, 1903	900 00
	<u>\$17,315 84</u>
Balance on hand at close of season.....	2,684 16

\$20,000 00

SEASON OF 1903.

(February 15, 1903, to November 15, 1903.)

RECEIPTS.

Balance from season of 1902.....	\$ 2,684 16
Appropriated by legislature May 12, 1902.....	30,000 00
Amount available for the season.....	<u>\$32,684 16</u>

EXPENDITURES.

Field work of surveying, Feb. 15, 1903 to Nov. 15, 1903.....	\$22,975 05
No expense for office work of drafting.....	0 00
Expenses of inspection on part of State, Feb. 15, 1903 to Nov. 15, 1903...	900 00
	\$23,875 05
Balance in State fund, Nov. 15, 1903.....	8,809 11
	\$32,684 16

The balance on November 15, 1903, to the credit of the survey fund (\$8,809.11) will be used to pay outstanding accounts of field parties still at work; a share of the office expenses of drafting the maps surveyed during the season just closing; and the estimated expenses of inspection by the State until May 12, 1904, the last day of the appropriation year.

The Federal fiscal year ends June 30th, and in accordance with agreement (see Appendix A) the expenditures of both parties to co-operation are equalized at the end of the Government fiscal year. Statements of the amounts paid out by the Geological Survey are furnished by the chief disbursing clerk for each month, and from these statements the following is summarized:

Total appropriation from the funds of the United States Geological Survey—allotments by the Director on April 12, 1901, June 28, 1902, and June, 1903—has been \$75,000.

Of this amount \$368.53 was withdrawn in June, 1902, to offset a similar amount lapsing to the State; \$1,800 has been deducted to cover expenses of general superintendence of the work by the Survey officials; \$62,916.24 has been expended for survey work up to November 1, 1903; and a balance of \$9,915.23 remained on the latter date with which to pay expenses of office drafting, of general supervision by Survey officials, and of additional field work until June 30, 1904, when the next Federal appropriation becomes available.

Of the amount paid for survey work up to November 1, 1903, about \$12,000 has been paid for office work of drafting.

The detailed results of the foregoing expenditures are given in the following record of progress.

RECORD OF PROGRESS.

WORK DONE PRIOR TO LEGISLATION.

Reconnaissance Maps. The first work done by the United States Geological Survey in Ohio was on a small tract of about 50 square miles sketched by L. C. Fletcher, topographer, to a reconnaissance scale in 1890, in connection with some work done in West Virginia when the Huntington quadrangle was mapped. The northwest corner of this sheet laps across the Ohio river, and covers an area of about 50 square miles of Lawrence county. This was mapped to a scale of 1:125000, and intended for reconnaissance purposes. During the progress of the present survey this area will be re-mapped in sufficient detail to be drawn upon the scale 1:62,500, or, about 1 mile to the inch.

In 1897 Messrs. Hersey Munroe and J. S. Smith commenced the mapping of the Ironton quadrangle, covering a part of Lawrence county, in Ohio, and also portions of Kentucky. This was likewise done on the scale 1:125,000, with a contour interval of 50 feet. During the year, June 30, 1897—June 30, 1898, they sketched 285 square miles in Ohio, and in connection therewith ran 190 miles of levels and established 28 permanent bench marks. The larger part of this leveling was done in 1897 and was based on the N. & W. R. R. levels at Ironton, and the bench marks thus set were stamped "I." Early in 1898 this Ironton bench mark was connected with the United States Coast and Geodetic Survey transcontinental bench mark at Hamden Junction in Vinton county, and the Ironton bench mark was found to be 3.430 feet too low. All the leveling done in the early part of 1898 was referred to the bench mark at Hamden Junction, accepted elevation formerly 706.665, and the permanent bench marks were stamped "A," meaning Athens datum. Accordingly, to the elevation stamped on bench marks "I" were added approximately 3 feet, giving the list as published in the Nineteenth Annual Report of the United States Geological Survey. By the adjustment of 1903, however, the Hamden bench mark is taken as 706.380, and the list of elevations given in Appendix F, of this report, is adjusted to this latest determination.

Season of 1898. A portion of the Ironton district was re-mapped in 1898 to a scale of 1:62,500 and a contour interval of 20 feet, and given the name of Ironton Quadrangle. Mr. Hersey Munroe, assisted by Mr.

W. N. Morrill, commenced work early in July, 1898, and completed the quadrangle—220 square miles in Ohio—during the season, running 64 miles of spirit levels and establishing nine permanent bench marks. The sheet was then drawn in the office and submitted for engraving.

Cincinnati sheets. Early in July, 1898, a party in charge of Mr. Chas. E. Cooke, began work on the East and West Cincinnati quadrangles, comprising the city of Cincinnati and vicinity, and lying partly in Kentucky, and surveyed them by February 1, 1899, to a scale of 1:62,500, and contour interval of 20 feet. In connection with the topographic work, 190 miles of levels were run and 19 permanent bench marks set. Of these latter, 9 are in Ohio and are stamped, in addition to the approximate elevation, with the letters "CIN," meaning that the elevations were based on the United States Coast and Geodetic Survey monument just north of the south door on the west side of the court house, the elevation of which is now accepted as 546.537 feet. This elevation is based on United States Coast and Geodetic Survey transcontinental line and line from Toledo, and upon United States Engineers' Ohio River line.

In October, 1898, Mr. S. S. Gannett measured and expanded a base near Columbus and connected the triangulation with the United States Coast and Geodetic Survey astronomical station at Columbus. This work furnished the primary control for the two quadrangles in which Columbus lies, named the East and West Columbus Quadrangles respectively, and also furnished a check upon the primary traverse lines run later between Cincinnati, Columbus, and Toledo.

Season of 1899. From the first of May until the middle of August, 1899, Mr. Hersey Munroe surveyed the two Columbus quadrangles to scale of 1:62,500 and contour interval of 20 feet. The area thus mapped was 462 square miles, in connection with which 312 miles of primary levels were run and 22 permanent bench marks established. These are all stamped "Columbus," and their stamped elevations are based on the aluminum tablet in the Columbus court house marked "778 Columbus," the elevation of which is now accepted as 777.295 feet above mean sea level. This elevation was determined by a line of precise levels run under Mr. Munroe's direction, from the Coast and Geodetic Survey transcontinental bench mark "Q" at Chillicothe, the elevation of which latter is now accepted as 638.182 feet.

Early in July, 1899, Mr. Chas. E. Cooke and party began and by November 20th completed the survey of the three quadrangles comprising Toledo and vicinity. These sheets are named respectively the Toledo, Maumee Bay, and Oak Harbor Quadrangles, and comprise a land area of about 500 square miles. They are to 1:62,500 scale and to 20 foot contour interval, and in connection with their mapping 168 miles of levels were run, and 18 permanent bench marks established, all being stamped with the elevation to the nearest foot and the word "Toledo" to show that

the elevations are referred to the Toledo datum—which is a copper bolt placed in the southwest side of the government building at Toledo, and lettered United States Coast and Geodetic Survey—the elevation of which is now taken as 603.889. This bench mark was established by the United States Coast and Geodetic Survey in 1899 from a line starting at Gibraltar, Michigan, and running south to Cincinnati. In this same region in first half of September, 1899, 87 miles of primary traverse were run, radiating from St. Mary's church spire, Toledo, previously located by the United States Lake Survey.

During the government year, 1899-1900, the East and West Cincinnati and Iron-ton sheets were engraved, and over 2,500 copies of each were printed and distributed by the Washington office. At the same time the East and West Columbus, Toledo, Maumee Bay, and Oak Harbor sheets were drawn up in the office and engraving begun on them.

All of the foregoing work, from 1890 to 1900, was done at the sole expense of the Federal Survey, as was also the work of the following season.

SEASON OF 1900.

Beginning in the early spring of 1900, after the law authorizing co-operation was passed, but before the State funds were available, the United States Geological Survey, entirely at its own expense, executed primary control covering about 7,000 square miles of area, and later carried on the office work of collecting, adjusting, and reducing to a uniform sea level datum, all existing precise levels in the State. Altogether this work cost the National Bureau about \$4,610, not counting the cost of office work of reduction the following winter. A more detailed statement of this work follows:

Primary Control. Three parties were placed in the State early in the year under the charge of Mr. S. S. Gannett, chief of the computing division of the United States Geological Survey.

One party under the immediate direction of Mr. Geo. T. Hawkins, ran a line of primary traverse from Cincinnati to Columbus, and two lines about 15 miles apart from Columbus to Toledo. This primary traverse was connected in the southern part of the State with the United States Coast and Geodetic Survey transcontinental triangulation, and in the northern part with the United States Lake Survey triangulation. It was also connected at Columbus with the triangulation already mentioned, controlling the two Columbus quadrangles.

Several primary traverse lines were run by Mr. E. L. McNair, between Cleveland, Wooster, Canton, and Carrollton. This work was connected with the United States Lake Survey triangulation and with that of Mr. Griswold.

Primary triangulation was extended by Mr. W. T. Griswold, between Moundsville, West Virginia, and Woodsfield, Carrollton, and Steubenville, Ohio. This primary control is connected with the United States Geological Survey triangulation in Pennsylvania, West Virginia, and Maryland.

The net results of primary control for the season were the running of 640 miles of primary traverse which established 225 geographic positions; the occupation and monumenting of 20 primary triangulation stations; and the establishment of 10 meridian marks. This primary work covered 7070 square miles distributed over portions of the following 31 counties, namely: Lucas, Ottawa, Wood, Sandusky, Hancock, Seneca, Wyandot, Hardin, Marietta, Union, Delaware, Fayette, Pickaway, Clinton, Warren, Clermont, Lorain, Cuyahoga, Geauga, Medina, Summit, Portage, Wayne, Stark, Columbiana, Carroll, Jefferson, Harrison, Guernsey, Belmont, and Monroe. Including the existing triangulation of the other Federal surveys above named, there were partly controlled by such work about 25 per cent. of the counties of the State, and there were available for topographic mapping 37 quadrangles, covering 8,500 square miles.

Topographic Mapping. No secondary topographic triangulation or traverse, no secondary leveling, nor contour sketching was done in Ohio this season.

Office Work. At Washington, upon the close of the field season, work was prosecuted upon collecting, adjusting, and reducing to a uniform mean sea level datum at Sandy Hook, all the existing precise levels. This included the precise levels of the transcontinental line of the United States Coast and Geodetic Survey, along the southern border of the State; also of the same Federal Survey between Toledo, Lima and Cincinnati; also precise water level tide gages of the United States Engineers at Toledo, Sandusky, Cleveland, and Ashtabula; and precise levels of the same organization along the Ohio River from Pittsburg to Wheeling and Cincinnati; precise levels of the United States Geological Survey Chillicothe to Columbus; precise levels of the Pennsylvania Railroad system from Pittsburg via Mansfield to Lima. These lines have furnished the necessary control for the succeeding three seasons, and with supplementary lines will answer for the entire work.

SEASON OF 1901.

Field work began about the middle of March and was continued until the first of November.

Primary Control. During the month of October, Mr. Sledge Tatum by means of 140 miles of primary traverse controlled four quadrangles

in the north-central portion of the State, in Lorain, Huron, Medina, Richland, Ashland, and Wayne counties. This traverse was based on the Camden and Townsend triangulation stations of the United States Lake Survey and on points near Millbrook and Burbank established in 1900 from primary traverse by E. L. McNair.

Twenty-seven 15-minute quadrangles, covering portions of eighteen counties in the northwest portion of the State were controlled or partly controlled by 160 miles of primary traverse run along railways by Mr. Geo. T. Hawkins. His line began at Toledo and ran west on the Lake Shore railway to Edgerton, thence on highways southwest to the Ohio-Indiana State line, thence down this line to the Findlay, Fort Wayne and Western railway, thence east along this railway. This was supplemented by 700 miles of primary traverse run by Mr. J. R. Ellis along highways following as nearly as possible meridians and parallels bounding quadrangles in this vicinity and in the central part of the State.

Mr. A. H. Thompson was engaged all season in extending primary triangulation in the southeastern part of the State in Harrison, Guernsey, Noble, and neighboring counties. In all he occupied 27 triangulation stations.

Topographic Mapping. Mr. Chas. E. Cooke, in charge of a party, completed the mapping of the Elmore, Fostoria, Findlay, and Bowling Green quadrangles, covering portions of Seneca, Sandusky, Wood, and Hancock counties.

Mr. Nat Tyler, Jr., and party surveyed the Fremont, Bellevue, Sandusky, and Put-in-Bay quadrangles covering portions of Erie, Sandusky, Ottawa, and Huron counties.

Mr. W. H. Griffin and party mapped the Olentangy quadrangle adjoining Columbus on the northwest. The name of the Olentangy quadrangle was later changed to Dublin Quadrangle.

Mr. Basil Duke and party completed the mapping of the Delaware quadrangle covering portions of Delaware, Marion, and Morrow counties.

Mr. Goodlove and party completed the mapping of the Vermillion quadrangle during the latter part of the season, covering portions of Lorain, Erie, and Huron counties.

Mr. Robt. D. Cummin was in charge of a party which completed the Euclid, Cleveland, and Oberlin quadrangles and partly mapped the Berea sheet. These quadrangles cover portions of Cuyahoga, Summit, and Lorain counties.

Mr. Hersey-Munroe and party completed the mapping of the Canton, Massillon, and Wooster quadrangles, covering portions of Wayne, Stark, and Summit counties.

Mr. W. T. Griswold and party completed the Cadiz quadrangle, and partially mapped the Scio and St. Clairsville quadrangles. These lie in

the eastern part of the State and cover portions of Harrison, Jefferson, Carroll, and Belmont counties.

Office Work. The eighteen sheets surveyed during the summer were drafted for engraving the following winter, and during the winter and early spring, photolithographic maps of these were made and copies sent to the State Survey officials. Computations of the primary control work were also carried on, and the precise leveling done in connection with mapping was adjusted.

Resume for 1901. In addition to the office work just mentioned in the above paragraph the results for the season were the mapping of eighteen quadrangles named respectively, the Dublin, Delaware, Findlay, Fostoria, Bowling Green, Elmore, Fremont, Bellevue, Put-in-Bay, Sandusky, Vermillion, Oberlin, Cleveland, Euclid, Wooster, Massillon, Canton, and Cadiz quadrangles; the occupation of twenty-seven triangulation stations and running about 1,000 miles primary traverse, controlling about 30 atlas sheets covering portions of 34 counties (an area of 6,900 square miles); and the running of 2,873 miles of precise levels, in the course of which 124 permanent bench marks were set, and the elevations of many other points accurately determined.

SEASON OF 1902.

Field work began about the middle of May and was continued until December.

Primary Control. Eleven 15-minute quadrangles, covering portions of Fairfield, Hancock, Athens, Vinton, Meigs, Gallia, and Lawrence counties were controlled by twenty-six triangulation stations, occupied by Mr. S. S. Gannett. Five 15-minute quadrangles in portions of Tuscarawas, Guernsey, Muskingum, Monroe, and Washington counties were controlled by twenty-two triangulation stations, occupied by Mr. Geo. T. Hawkins. Two 15-minute quadrangles immediately north of Cincinnati, covering portions of Hamilton, Warren, and Butler counties were controlled by eighty-two miles of primary traverse run by Mr. J. R. Ellis. This work was based on the transcontinental triangulation of the United States Coast and Geodetic Survey connected with previous work in the northeastern part of the State, so that all triangulation in Ohio is now reduced to the United States Standard Geodetic datum.

Precise Levels. Mr. W. H. Baldwin, in the fall of 1902, ran 60 miles of levels for the purpose of connecting the United States Lake Survey levels with the levels of the Pennsylvania railroad. This line extends from Cleveland to Canton, and in connection with it three permanent bench marks were established. The results furnish the data from

which to reduce the spirit levels in that part of the State to mean sea level at Sandy Hook, N. Y.

Topographic Mapping. Messrs. Charles E. Cooke, Basil Duke, and C. W. Goodlove and party completed the mapping of the Ohio portion of the Steubenville quadrangle, covering parts of Jefferson county. The area surveyed within the State was 125 square miles.

Mr. W. H. Griffin and party completed the mapping of Westerville quadrangle, in parts of Delaware, Franklin, and Licking counties and also four square miles of the Clarington quadrangle in Monroe and Belmont counties.

Messrs. Van H. Manning and Duncan Hannegan and party, completed the mapping of the Ohio portion of the Wellsville quadrangle, lying in parts of Columbiana and Jefferson counties, amounting to 155 square miles. They also mapped 27 square miles of the Salineville quadrangle, lying in parts of Carroll, Columbiana, and Jefferson counties.

Mr. W. T. Griswold, assisted by Mr. M. J. Munn, with a party completed the mapping of the Scio quadrangle, lying in portions of Carroll and Harrison counties, and covering an area of 228 square miles. This party also mapped 156 square miles of the St. Clairsville quadrangle, covering parts of Belmont, Jefferson, and Harrison counties. They also partially controlled the Flushing quadrangle, lying in portions of Harrison, Belmont, and Guernsey counties.

Messrs. H. B. Blair, and W. J. Lloyd, assisted by Mr. C. L. Sadler, completed the survey of 35 square miles of the New Matamoras quadrangle, lying in portions of Monroe and Washington counties.

Mr. Robert Cummin and party completed the survey of the Berea quadrangle, which had been commenced in 1901. This quadrangle lies in portions of Cuyahoga, Lorain, and Medina counties, and covers 224 square miles.

Mr. W. N. Morrill and party completed the survey of the Parkersburg and Marietta quadrangles, covering portions of Washington county. The area mapped in the course of this work was 300 square miles.

Mr. N. W. Brown and party were engaged in topographic surveys in West Virginia and completed the mapping of the Cameron sheet, in connection with which one square mile of the area of the State of Ohio was mapped in Belmont county.

Office Work. During the winter of 1902-03 the leveling notes taken during the preceding summer were adjusted. Those sheets which were completely surveyed during the preceding summer, were drawn in preparation for engraving. Photolithographic maps of the sheets surveyed in 1901 were also printed.

Resume, 1902. In all, eight parties were engaged in topographic surveying on 14 quadrangles, eight of which were completed, namely: Steu-

benville, Westerville, Wellsville, Berea, Scio, Parkersburg, Waverly, and Cameron—this last however covering but one square mile of Ohio. Six were partially surveyed, namely: Woodsfield, Salineville, Macksburg, New Matamoras, St. Clairsville, and Flushing quadrangles. In all, 1477 square miles of the total area of the State were completely mapped; 669 trigonometric locations were determined; 2,935 miles of levels run, in the course of which 51 permanent bench marks and 9,256 other elevations were established; and 5,517 miles of road traverse were run. This work was all mapped in the field to a scale of 1 : 45,000, with a contour interval of 20 feet, with the exception of the Westerville quadrangle, the contour interval on which was 10 feet. In addition, the above mentioned office work was done.

SEASON OF 1903.

Field work was begun about the middle of May and continued until December.

Primary Control. Mr. George T. Hawkins, aided by Mr. J. R. Ellis and party, ran primary traverse for the control of various areas in the western central portion of the State in the counties of Madison, Clark, Miami, Greene, Montgomery, Preble, Darke, Mercer, Van Wert, Auglaize, Clinton, and Warren. This party controlled eleven quadrangles by running 750 miles of primary traverse. In the northeastern part of the State in Ashtabula county, two quadrangles were controlled by a party, (under charge of Mr. C. B. Kendall) which ran 116 miles of primary traverse for this purpose.

Topographic Mapping. Mr. W. T. Griswold, aided by Messrs. M. J. Munn, Robert Coe, and A. O. Burkland, completed the mapping of the Flushing quadrangle, lying in portions of Belmont, Guernsey, and Harrison counties, and covering 228 square miles.

Messrs. W. H. Griffin, E. C. Bebb, and Basil Duke, assisted by Mr. C. H. Birdseye, mapped the Ohio portion of the Clarington quadrangle, amounting to 177 square miles, covering portions of Belmont and Monroe counties. With the assistance of Messrs. Duncan Hannegan and C. L. Sadler, this party also completed the mapping of the Woodsfield quadrangle, lying in portions of Guernsey, Noble, Belmont, and Monroe counties, and covering 229 square miles. Later, Messrs. Griffin and Sadler and party completed the mapping of the Hamilton quadrangle, in portions of Butler and Hamilton counties, and covering 231 square miles. The same party procured secondary control for the Bethany quadrangle, in portions of Butler, Warren, and Hamilton counties.

Messrs. Van H. Manning and W. J. Lloyd, aided by Mr. Sadler and parties, completed the mapping of the New Matamoras quadrangle, lying

in portions of Washington and Monroe counties, and covering 230 square miles, 35 of which were mapped in 1902. Mr. Manning, assisted by Messrs. H. L. Johnston and C. G. Anderson, completed the mapping of the Athens quadrangle in portions of Athens, Morgan, and Hocking counties, and covering an area of 231 square miles. The same party secured the control of Sycamore quadrangle, lying in portions of Crawford and Wyandot counties. Later in the season Messrs. Merrill Hackett and C. H. Birdseye completed the mapping of 116 square miles of its area. Mr. Manning's party also procured secondary control for the following quadrangles; Cutler, in the counties of Athens, Washington, and Morgan; Dayton, in the counties of Miami, Montgomery, Greene, and Clark; Lima, in the counties of Allen and Auglaize; Mt. Sterling, in the counties of Fayette, Madison, and Ross; Orland, in the counties of Vinton, Hocking, and Athens; Springfield, in the counties of Clark and Greene; and Tiffin in Seneca county.

The parties in charge of Messrs. M. Hackett and C. W. Goodlove, completed the mapping of the Macksburg quadrangle, covering 230 square miles, lying in portions of Washington, Monroe, and Noble counties. Mr. Hackett also had charge of a party which completed the mapping of the Marion quadrangle, lying in portions of Marion, Wyandot, and Crawford counties, and covering 227 square miles.

Mr. Hoyt L. Johnson, assisted by Mr. J. T. McCoy, completed the Salineville quadrangle commenced in 1902. They mapped 200 square miles, covering portions of Carroll, Columbiana, and Jefferson counties.

During July and August, Mr. Hannegan, and thereafter Mr. Goodlove, had charge of a party which completed the mapping of Akron and Kent quadrangles, lying in portions of Summit, Portage, and Medina counties and covering 456 square miles.

Messrs. Robert D. Cummin and Robert Coe, and party, completed the mapping of the Ashtabula quadrangle, covering portions of Ashtabula county, the land area of which quadrangle is 117 square miles. The same party also completed the mapping of the Madison quadrangle, covering a portion of Lake county, and having a land area of 53 square miles; and the mapping of the Mentor quadrangle, lying in portions of the counties of Lake, Geauga, and Cuyahoga, and covering a land area of 187 square miles.

Mr. W. N. Morrill, assisted by Mr. J. R. McMillan, and party, completed the Ohio portion, 10 square miles in area, of the Belleville quadrangle, lying in portions of Meigs, Athens, and Washington counties. His party mapped the Ohio portion of the New Martinsville quadrangle, covering 80 square miles, lying in parts of Monroe county. Mr. Morrill's party procured partial control for the St. Mary's quadrangle, lying in portions of Washington county.

Office Work. The office work of drafting the 17 quadrangles completed during the season just closed, will soon be begun. All of the pre-

cise levels run during the preceding seasons have undergone extensive adjustment, and the elevations according to this latest adjustment are herewith presented in Appendix F. Seventeen quadrangles surveyed in 1901 were engraved and printed during October and November, the eighteenth one, namely, the Sandusky quadrangle, being now in press.

Resume for 1903. During this season there were mapped 3,017 square miles of the State; 2,056 trigonometric locations were determined; 7,778 miles of spirit levels were run, during which 209 permanent bench marks were established, and 30,908 elevations established in addition; 13,611 miles of road traverse were run. In all, nine parties were engaged during the season in work on 27 quadrangles, 17 of which were completed, namely: Akron, Ashtabula, Athens, Belleville, Clarington, Flushing, Hamilton, Kent, Macksburg, Madison, Marion, Mentor, New Martinsville, New Matamoras, Salineville, St. Clarisville, and Woodsfield. In addition, ten sheets were partially surveyed, namely: Bethany, Cutler, Dayton, Lima, Mt. Sterling, Orland, Springfield, St. Mary's, Sycamore and Tiffin. In addition to this, the office work mentioned in the preceding paragraph was done.

SUMMARY TO NOVEMBER 15, 1903.

The results accomplished to date are best seen by an inspection of the Progress Map accompanying this report, as a frontispiece. Fifty-two sheets lying wholly or partly within the State have been completely surveyed, and of this number twenty-eight have been engraved and printed and are now available; ten have been partly surveyed, making a total equivalent area of nearly 10,000 square miles completely surveyed, the larger portion of which is in the roughest portion of the State. In addition primary control has been extended over 129 quadrangles, fifty-two of which have been mapped as above stated. The complete map of the State will cover 212 quadrangles in whole or in part. For a more compendious statement of results see Appendix B.

USES OF TOPOGRAPHIC MAPS.

The possible uses of contour topographic maps are so extensive as to almost defy enumeration. Such maps not only answer a great variety of questions, but frequently suggest phases of problems that would not otherwise have arisen but for the study of these maps. Some of the more obvious uses are given below.

Agricultural. The lay of farm lands—how much hill land and how much bottom—can be seen by an intending purchaser without visiting the premises, if such a map is examined; and the suitability for proposed agricultural purposes may often be inferred from an inspection of the map. It will also serve for a base for land-classification surveys by the National Government. Such surveys have already been initiated in other states by the National Department of Agriculture.

Administrative purposes will be served by these maps. There is hardly a bureau in our State Government that will not in some way find them useful. The Board of Public Works could have used such maps for determining the watersheds tributary to, and estimating the available water supply for, summit levels of the canals; or for projecting new feeders. The Board of Health would find them useful in passing upon sanitary projects submitted for approval. The Railway Commissioner could use them for checking mileage and as a base for railway maps of the State. They would answer many questions affecting legislation, and court decisions. They would form basal maps for special purposes for the State Board of Agriculture, Mine Inspector, Canal Commissioners, etc.

Educational. Universities, colleges, academies, and high schools will find these maps extremely useful in studying scientific problems. Even the common schools will find them useful in studying geography, for, the present day method of teaching this subject is to begin with local surroundings. An excellent map of any county can be readily obtained, at a merely nominal cost, upon the completion of the survey by simply pasting together the necessary sheets. It is said that in New Jersey every school in the State is provided with a full set of the topographic maps of the State.

Engineering enterprises are greatly facilitated by these maps. The Engineering News of May 21, 1903, contains an account of a recently built section of railway line, in which the writer states that \$85,000 was

saved to the company by discovering a better route on the Co-operative Survey maps, than that chosen and about to be built upon before the region was mapped by the United States Geological Survey.

Industrial projects are served by these maps. The projection of electric railway lines is rendered economical because the expense of a preliminary survey is frequently rendered unnecessary. The location of water-powers is greatly facilitated, since it can be seen to what extent the water will be impounded by a dam of given height, or what length of canal or hydraulic will be required for a given fall, etc.

Military. Topographic maps are needed in planning movements of State or National troops. Indeed this was the way the topographic map originated. Napoleon is said to have organized the first topographic corps, and on the maps of his topographers every detail affecting the movement of troops was shown. This required the slope to be represented, which was done by the laborious system of hachures, which, besides being difficult and tedious to make, obscured the other features of the drawing. The simple device of contour lines now does this with all the accuracy of hachures, and does not obscure the other features.

Municipal projects such as public water supplies and sewerage systems find topographic maps indispensable for their study. Topographic maps are indispensable for laying out town sites, or for intelligently making large additions to existing towns.

Pleasure Seekers, whether touring on wheel, automobile, riding, or driving, will find these maps a reliable guide for journeying. All who travel the public highways in portions of the State unfamiliar to them will find these maps useful and convenient guides.

Public Improvements of many descriptions will be served by these maps. County commissioners and township trustees will find them useful in projecting new roads. They would form the basal maps for a general scheme of improvement of the existing highways of the State, should this latter be taken up at some future time. They will be useful for laying out ditches, and improving drainage generally.

Scientific questions of many kinds will be studied by the aid of these maps. In fact the origin of the topographic work of the United States Geological Survey was to furnish a basal map for the study of the geology of the country. Following the topographic survey of the eastern portion of the State the Federal Survey has already made a study of the Cadiz oil field at its own expense and has published a bulletin concerning the same. A biological survey of the State can be better made by these maps. The problems of deforestation and its remedy, will be studied by the Forestry Division of the Agricultural Department, after these maps are available.

Surveyors generally over the State will be benefited because the triangulation and primary traverse points will form base lines upon which

to make cadastral surveys for taxation and other purposes. The numerous bench marks over the State will be very useful for determining elevations for laying out ditches, highways, and many other improvements. The elevation of any point above sea level can be readily and accurately determined, and in future surveyors will refer all elevations to the same reference plane. At the present time the elevations of one town with reference to those of another, frequently cannot even be guessed, because one city surveyor assumes an arbitrary datum, while the second may make a radically different choice. The bench marks of the Geological Survey will not only render the elevations of adjoining towns comparable, but will make them comparable with adjoining counties and even adjoining States, for the bench marks in every State in the Union will be referred to one universal reference surface, the level of the sea.

Since a brief account of the methods used by the Survey will tend to a more extended and intelligent use of the maps, such an account is herewith appended.

METHOD OF SURVEYING AND MAPPING.

The United States Geological Survey was organized in 1882 and has shown itself to be one of the most aggressive and progressive bureaus of our national government. Originally organized to carry on geological investigations, which involved making preliminary small scale topographic maps for basal purposes, its organization has grown to include a completely organized Hydrographic Branch, and a Publication Branch which in addition to other work of a high order engraves and prints the sheets of the Topographic Branch handsomely in colors. The scope of the Geological and Topographic Branches has been greatly widened since the inception of the bureau, necessitating likewise extensive growth in the remaining or Administrative Branch of the Survey. From somewhat crude beginnings in 1882 the Topographic Branch, under which the work in Ohio is done, has developed its present improved methods as laid down in Monograph XXII and the manual of May 1, 1903, entitled Instructions Relating to the Work of the United States Geological Survey, which were prepared under the supervision of the Director. The following brief explanations were taken chiefly from these sources, and any one who is especially interested is referred to these two volumes, where he will find a very complete and comprehensive system developed.

The Federal Survey has undertaken to make a contour topographic map of the entire country. It is prosecuting this work at many places, as previously stated, with the co-operation of the local governments. The whole country is divided into districts, and each year a number of these are completed. These districts might be limited for convenience by natural boundaries, as in the case of counties or similar civil divisions, but it has been found far more convenient to divide the total area into quadrangles, by parallels of latitude and meridians of longitude, and map these one by one. This system has accordingly been adopted, and it has great advantages in the way of uniformity of size of, and ease of reference to the different sheets.

To produce an accurate and trustworthy map of any extended area, such as a state, the position of the tract upon the earth's spheroid must first be fixed. To do this the geographic position of a large number of points within the area must be accurately determined. This may be done in three ways: by astronomical observation; by extending triangulation from points whose positions have been previously accurately determined or assumed; and by primary traverse, which consists in determining new

positions (from old ones assumed or previously determined) by a series of linear measurements combined with angles, similar to the method of running a railroad preliminary line with a transit. These three operations, together with the careful determination of a system of elevations, are embraced in the term "primary control."

All three methods of primary control have been used in Ohio, the first only sparingly, however. The latitude and longitude of a monument in the Capitol grounds at Columbus was determined astronomically by the United States Coast and Geodetic Survey during their transcontinental survey. A base line was measured and a system of triangulation was expanded in the vicinity, by the present Survey, and connected with this monument, and later it was joined by primary traverse lines to the triangulation systems across the northern and southern parts of the State. These later connections showed the point thus determined at Columbus to have a station error of considerable amount. Since this was the only instance of astronomical methods employed to determine position and of base line measurement, no detailed account of these methods will be here given. See Monograph XXII for such an account.

Primary Traverse and Primary Triangulation are the two methods used to cover practically the whole State with horizontal control. The latter method is capable of much the greater refinement, but becomes too expensive to use in a flat country like the northwestern portion of Ohio, on account of the expense of erecting signals. The eastern and southeastern portions of the State, or approximately that part lying east of a line drawn from Cleveland through Columbus, lie favorably for triangulating and therefore will be covered with this form of control. As early as 1889 the Coast and Geodetic Survey had carried a belt of triangulation across the State following closely the 39th parallel of latitude. Previous to this the United States Lake Survey extended a system of triangulation across the northern part of the State closely following the shore of Lake Erie. The accuracy of these two systems is shown by the fact that, although conducted independently and by different organizations at different times, after being separate for a distance of several hundred miles, when connected in eastern Ohio, they showed a discrepancy of only twenty-seven feet in determining a given position; and, quite a part of this discrepancy is to be charged to the connecting system. These two Federal Surveys, therefore, have furnished an excellent base upon which to found the remaining primary control in Ohio, and the United States Geological Survey in furnishing supplementary control has used and will use their work as basal.

The *Primary Triangulation* of the Geological Survey is carried on under the following regulations. Theodolites with eight-inch circles reading by micrometer eye-piece to two seconds of arc, are used. Instruments are always placed over the center of stations if possible, to avoid reduction to center, and are protected from sun and wind by suit-

able means. In measuring angles extra precautions are taken to guard against such sources of error, as micrometer run, error of adjustment, and eccentricity, and no angle is considered as finally determined that has not been measured on at least five different parts of the circle. The error of closure of any triangle in primary schemes must not exceed five seconds of arc.

In connection with the triangulation in each general locality observations on Polaris for azimuth must be made on two nights from at least two stations. These observations to consist of not fewer than six angles between mark and star with telescope direct and reversed. Great care must be taken in adjusting and leveling horizontal axis of the theodolite, and watch error must be determined by telegraphic comparison of time, or by astronomical observation. The mark must consist of a small box with a slit one-eighth of an inch wide placed at a distance of not less than one mile from the instrument. A systematic form of field notes is enjoined for these observations, as well as for all the other field observations.

Primary Traverse. The outfit for Primary Traverse consists of a high grade engineers' transit reading at least to half minutes, a 300-foot steel tape, a spring balance, one 100-foot steel tape, two thermometers, four hand recorders, two flag poles, and a good watch. The party should consist of one chief, as transitman, one recorder, two tapemen, and one flagman. At each station the transitman should proceed as follows: Set telescope on rear flag, read both verniers, transit telescope, set on front flag and read both verniers. Shift the circle and re-measure the same angle with telescope reversed. If the two angles thus measured differ more than 60 seconds, repeat the operation.

Railroads furnish the most advantageous routes for primary traverse, because of their moderate grades and favorable alignment. Along these the front tapeman puts a twenty-pound tension on the front end of the 300-foot tape with a spring balance. He makes a chalk mark on the rail, or places a tack or nail on a tie, stake, or measuring board, under the 300-foot mark for full tape lengths, and under the fractional graduation at stations. The distance which he records is checked by the transitman and by at least one other member of the party. The tack or nail is left surrounded by conspicuous chalk marks, and the same process is continued. The rails should be counted by two other members of the party, who also check the number of tape lengths at the first opportunity. Each station should be marked by a small-headed tack or pricking needle through a piece of white paper or cloth, its number being chalked on the rail near where it falls. The distance between stations should be limited to the visibility of the flag pole. Rails or center of track must not be used as alignment sights.

Along highways or open country the tape should be kept level. On steep slopes a plumb-bob must be used, either to bring the tape vertically over an established point or to establish a new one, as the case may be. Tape lengths are marked on the measuring board, tie, or stake with the pricking needle. Where slopes are so steep as to render the leveling of the 300-foot tape impracticable a shorter tape must be used. The chief and two other members of the party must keep an independent count of the tape lengths. The temperature of the tape must be taken every hour of the day. Stations should be made at even tape lengths when practicable.

Observations for azimuth should be made on Polaris at the end of each day's work when practicable, and azimuth stations not to be more than ten miles apart except on long tangents. These observations and reductions are made in accordance with the method explained in the latest manual of the General Land Office, and are to consist of not less than three direct and three reverse measures on three parts of the circle between Polaris and azimuth mark. The watch to be compared with standard time often enough to determine its error within ten seconds. If the traversed line is very crooked the instrument should be provided for making solar azimuth observations, and these made twice each day in addition to Polaris observations.

Two permanent marks, either copper bolts or the standard bronze tablets of the Survey, should be placed not less than 500 feet apart at the beginning and end of each line, also at prominent junction points from which other primary control lines may be started. Careful records, according to prescribed forms, are to be kept of all operations, and the positions of many topographic features on the line of the work are also recorded.

Spirit Leveling. After the determination of the horizontal or geographical position of a system of points by any of the methods preceding, the determination of the elevations of these points above mean sea level completes the work of primary control. These elevations are determined by spirit leveling, and this work is entirely independent of the work of horizontal control; it may precede, be carried on simultaneously with, or follow the latter. In connection with the transcontinental triangulation belt, the United States Coast and Geodetic Survey carried a line of precise levels across the country. This line crossed Ohio along the line of the Baltimore and Ohio Southwestern railroad from Parkersburg through Chillicothe to Cincinnati. The United States Lake Survey has also carried a line of precise levels, largely by means of water gages, from Sandy Hook up the Hudson to Lake Ontario, and along the line of the Great Lakes to Duluth. The United States Engineers have carried a line of careful levels from Pittsburg along the Ohio River to Cincinnati. The Pennsylvania railroad has carried precise levels from the sea-board westward through Pennsylvania and Ohio, along the Pittsburg,

Fort Wayne and Chicago railroad in the latter State. Finally the Coast and Geodetic Survey in 1899 connected its own transcontinental line with the Lake Survey levels by a line of precise levels from Gibraltar, Michigan, through Toledo and along the Miami and Erie Canal to Cincinnati. All these lines have thus furnished excellent basal control for the subsequent spirit leveling of the Co-operative Survey in this State.

The United States Geological Survey has been constantly supplementing the foregoing systems by new connecting lines until in the spring of 1903 enough data were accumulated to enable a grand adjustment of the network of precise levels to be made by the United States Coast and Geodetic Survey. This adjustment includes the precise levels of the Mississippi River Commission, and of other organizations, and the resulting determinations of the data in Ohio are probably now within a few tenths of a foot of the true elevation above mean sea at Sandy Hook, New York.

The spirit leveling of the present Survey is carried on under the following regulations. For each general locality, the elevation of one point is very carefully determined and taken as the datum for that locality. Thus, for Columbus, the elevation of an aluminum tablet, set in the Franklin county court house, was carefully determined by a double line of precise levels from the United States Coast and Geodetic Survey bench mark at Chillicothe. All bench marks and other elevations in the vicinity of Columbus were determined by level circuits starting from and checking on this court house bench mark, and the bench marks so set were stamped with the word "Columbus," thus indicating the datum to which they were referred. In addition to the word "Columbus," the elevation to the nearest foot was stamped on each bench mark. Elevations cannot be more closely noted on the monuments owing to the fact that during the early part of any extensive survey the determined elevations of many of the data must necessarily be subject to considerable change by later and increasingly more accurate adjustments. In any case, the exact elevations, to one-thousandth of a foot, given by the latest adjustments, may be had from the published lists.

In the West two permanent bench marks are set in each township or equivalent area; east of the 95th meridian at least one is to be set to each 36 square miles of area. These bench marks are bronze or aluminum tablets firmly cemented into masonry foundations of buildings, in bridge abutments, or some other permanent structure. They will prove extremely valuable to the surveyors and engineers of the State. The instrument used in setting them, as indeed in all the precise and flying levels of the Survey, is the ordinary Engineer's Wye level. Careful instructions covering every detail of the work are contained in the manual of instructions, and forms of record for each class of work are prescribed. The error of closure allowed in the circuits of precise leveling for establishing bench marks is, in feet, not to exceed 0.05 times the square root of the distance run in miles.

At least two primary triangulation points or two primary control lines have previously been required to be established within a fifteen-minute quadrangle before secondary control may begin on it, and the sketching be completed. This requirement has now been raised in the case of primary traverse so that, at present, primary control lines must traverse two sides of a sheet, and frequently all four sides are so traversed. Since primary control must undergo adjustment at the end of the season before being plotted on a topographic sheet, the necessity of keeping it well in advance of the secondary work is apparent. The primary control locates the quadrangle geographically on the earth's surface, the secondary control locates all prominent points interior to the sheet with reference to the primary control. Since, after adjustment, the latter is assumed to be absolutely correct, it is evident that a greater relative error may be permitted in the secondary work. The above requirements satisfied, secondary control is begun.

Secondary Control comprises secondary triangulation by transit or plane-table, usually the latter, secondary traverse by stadia or by buggy, and flying levels. These will be passed over very briefly, as a full explanation of them may be found in the Survey publications already noted, or in a number of text-books on surveying.

In hilly country like southeastern Ohio, numerous points, such as churches, lone trees, hill tops, etc., are located by plane-table triangulation, the instrument occupying first the primary stations, and later secondary stations of its own determining, and frequently points located by resection or the three point problem. The plane-table employed in this work by the Survey is admirably simple in design, and is provided with telescopic alidade with vertical arc and stadia wires which prove extremely useful for locating supplementary points and elevations. The plane-table is the topographers instrument par excellence except for the one drawback of exposing the map to the moisture of foggy mornings or showers.

After the quadrangle is well spotted with secondary locations, the roads may be traversed by buggy, and frequent ties made to these secondary points. In buggy traverse the wheel is the distance measurer, and a small sight alidade placed on the small plane-table board is the direction indicator. A magnetic needle attached to the board is also provided as a means of orienting. The circumference of the buggy wheel being known, its revolutions are counted by means of odometer or by the traverseman, for distances. The results that may be thus obtained are surprisingly accurate to an initiate. Of course the circuits will not exactly close, and the traverseman is required to clearly show the discrepancy. After a number of these have been run connecting on themselves or each other, they are adjusted and transferred to the topographer's sketch sheet.

Buggy traverse is also used in connection with primary traverse in flat country, except that here it constitutes the bulk of the secondary horizontal control. The traverseman, in addition, locates many prominent topographic features along the road by means of intersections. When streams or ridges are not traversed by highways, they may be traversed by stadia lines.

Before, or along with, the buggy traversing the flying levels, so called, are run. They are usually run along the highways and consist of determining the elevations of road crossings, summits, depressions such as stream crossings, and other prominent points. An engineer's wye level is used for this purpose and circuits are run always closing on themselves or on each other; but since these elevations are for sketching purposes, the same degree of accuracy as for bench mark levels is not required. The frequent elevations thus determined are painted on adjacent fences at the roadside opposite the point, on telegraph poles, or wherever they will be readily seen by the contour sketcher who is to follow.

Topographic Sketching. After the secondary horizontal and vertical control is established and adjusted, the sketching of the contours and remaining topography follows. Contour sketching requires a trained eye and should be done by a person of some years' experience, who is ordinarily the chief of the party. Before beginning the sketching in the field he avails himself of all the maps, surveys, and other information obtainable concerning the sheet, in addition to that gathered by his own men. Contour sketching is done on the plane-table with telescopic alidade, and the instrument occupies many points determined by plane triangulation, or traverse, or both, the topographer being assisted in tracing the contours by the numerous elevations along the roadside. The scale of the published maps is 1:62,500 or about one inch to the mile. The smallest distance, therefore, that can be scaled on the map is about 50 feet. The topographer, therefore, must locate his points within this distance of their true position. To more easily accomplish this the field sheets are sketched to a larger scale than the published maps. A scale of 1:45,000, or about one inch to 4,000 feet, is used for the field sketches, including buggy traverse sheets.

At the close of the field season the contour maps are drafted and prepared for engraving in the Washington office. The work of drafting consists of inking in the drainage, culture, and contours, and of lettering the topographic features. Since three separate engravings on copper have to be made for each quadrangle, one for drainage printed in blue, one for relief printed in brown, and one for culture printed in black, the disposition of the lettering requires extreme care. Before being submitted for engraving the work is carefully edited. Names of localities are examined and official spelling adopted for such names as have been passed upon by the United States Board on Geographic Names, and other accepted authorities. All other features and symbols are edited according to an established standard code.

The engraving and printing complete is done by the Publication Branch of the Survey at its Washington office, and is of unequalled clearness and elegance. The Federal Bureau assumes complete control of printing and distributing all maps of its making, no matter in what State, and this is a wise provision, because few States can hope to maintain at present such efficient publication facilities, and, in addition, the small fee charged for each sheet prevents wasteful distribution. This fee covering the cost of production, is five cents per sheet, unless one hundred are ordered in one order, in which case they are two cents apiece. They are obtained by enclosing postoffice money order, not stamps, addressed to the Director, U. S. Geological Survey, Washington, D. C., and should be called for by the name adopted for each sheet. The name chosen is usually that of the most prominent feature within the quadrangle.

•

INSPECTION.

Finding the task of examining the results submitted by the Geological Survey burdensome and of a nature requiring the services of a person experienced in surveying and mapping, you appointed on August 2, 1901, Professor C. N. Brown to look after the interests of the State. The untimely death of Professor Brown on March 6, 1902, deprived the State of an extremely useful and efficient servant, but not before he had made a lasting impression on the work.

The Geological Survey has shown itself hospitable to suggestions, and during his short term of service Prof. Brown suggested a number of valuable improvements which were adopted, one of which was the numbering of the sections on the maps. To one not acquainted with the State this may seem of minor importance; but in Ohio practically every system used in other states in laying out land was employed, and in addition some systems which have never been tried elsewhere, have been used here. The numbering of the sections and the marking of the boundaries of these special districts will enable any one to readily follow the various systems used by the Government surveyors when the lands of the State were first laid out.

The United States Geological Survey officials, one and all, have afforded every opportunity for the inspection of the work, and I desire here to thank them for the courteous treatment received. The best of good feeling has prevailed between State and Federal authorities, and hearty co-operation has marked the progress of the survey from its beginning.

I take pleasure in stating that the Federal officials have shown themselves zealous in faithfully carrying out the provisions of the agreement, and that in all but a few minor instances, where temporarily impracticable, the terms of the agreement have been strictly complied with. Further, the Survey officials have done more in some instances than required to do by the terms of the agreement. The agreement for the season of 1901 calls for a contour interval of 20 feet, but the sheets in the northwest portion of the State were surveyed during that season to a 10 foot contour interval. The Survey also went to the expense of engraving a plate in an additional color to represent section numbers on these sheets. Engraved proofs showing outlines of wooded areas on the sheets thus far surveyed, have not yet been furnished, for the reason that the Geological Survey

is considering the advisability of printing the outlines of wooded areas as a green overlay upon all the finished maps, and if this is done it will be a much more valuable arrangement for the general public, than the arrangement as per agreement.

The work of inspection has consisted of investigating the methods and execution of the Survey, of carefully examining the photolithographic and engraved proofs submitted, of examining and checking the expense vouchers to be paid, and of collecting and editing the resulting data, aside from maps, for State publication. The Federal survey also publishes these data from time to time in annual reports and special bulletins.

Regarding the methods of the survey, would say that they are efficient and economical for the purposes intended, namely: the production of a map to scale 1:62,500. The long experience of the Federal bureau has enabled it to perfect its organization, and to select methods best adapted to the two distinct kinds of topography, encountered in the State. A description of these methods has been given in the foregoing pages.

Three field parties have been visited and the results of buggy traverse, plane-table triangulation, and flying levels noted. These results showed that the methods employed enabled errors to be readily kept well within the allowable limits laid down by the Survey manual of instructions.

The work of primary control has not yet been examined. The greater portion of this has been executed before your present representative could inspect the same. It is based, however, upon the best basal control possible to obtain, that of the United States Coast and Geodetic Survey triangulation system, and that of the United States Lake Survey. The work of these two organizations has been connected by the United States Geological Survey by no less than three lines of primary triangulation or traverse across the State which enables all work now to be reduced to United States standard geodetic datum.

More primary control is used for each sheet now, than at the beginning of the survey. Formerly primary traverse on two sides of the sheet was deemed sufficient. A recent innovation by the Federal Geological Survey is the use of primary traverse on the four sides of each sheet.

Seventeen engraved sheets have been carefully examined. The engraved maps of the United States Geological Survey represent probably the most elegant work, in the way of map printing, done in this country, and few indeed are the flaws that can be found in their drafting, engraving, and printing. However, anyone with large experience knows how easy it is to occasionally print an erroneous figure, or omit some useful information from a map, especially where the aggregate of the information published is very great, and such a person will welcome corrections or useful additions to his work. Some few of such amendments have been made and will receive consideration in the next editions. It was thought not wise to delay the publication of the 1901 sheets, to make

these improvements now, in order that the results of the surveys of 1901 might be immediately available.

The vouchers forwarded by the chief clerk of the United States Geological Survey have been uniformly correct, no inaccuracies worthy of mention having been found. In some cases where it appeared that a mistake might have been made in the rates for subsistence, written inquiries have brought responses confirming the statements of the sub-vouchers. The expenditures by the State in some months have greatly exceeded those of the Geological Survey, and at other times those of the latter have been greatly in excess. Such arrangements have been willingly made by both parties to co-operation, in order that the work might at no time be delayed. The expenses on both sides are balanced on June 30th of each year.

In January last a visit was made to the Washington office and the work of drafting, editing, engraving, and printing inspected. Topographic sheets mapped by the Geological Survey in every part of the United States are engraved in this office. They are listed for engraving in the order of completion, and, owing to the large number of sheets turned into the office, the work of engraving is not able to keep pace with that of surveying. Consequently; a quadrangle mapped one season is usually not ready for printing until the second season following. The care with which the drafting, engraving, editing, and printing is done, would of necessity delay the publication nearly one year after completion of the surveying.

RECOMMENDATIONS.

The people of the State are to be congratulated upon the good progress made toward securing a complete map of the State, and should see to it that the consummation of their wishes is not delayed. The appropriations thus far made have secured the expected results and there is thus far no reason for changing the original estimate. It is estimated that \$25,000 per year for five years will complete the survey at the expiration of that time.

Good results are already following the work done. On another page is recounted the saving of \$85,000 to one enterprise by the publication of one sheet alone. Elsewhere is noted the reconnoissance of oil fields following the topographic work. The Federal Survey has also in preparation a Geological atlas of one quadrangle. Most important of all, however, twenty-eight sheets covering over 5,000 square miles of the State have been handsomely engraved and printed and are now available; twenty-four others have been surveyed and are being prepared for engraving while other sheets still are partly surveyed, and much primary control has been done. Last but not least the elevations and geographical positions of numerous permanent marks in various parts of the State have been determined. These results are tabulated in the appendices to this report.

The United States Geological Survey upon the completion of the work will probably publish in convenient and concise form a descriptive list of all such marks. Partial lists of this kind have already been published for other districts by the Federal Survey. If this is not done by the National Survey, it should be done by the State.

After the completion of the work the final adjustment of all bench marks can be made to probably within a tenth of a foot of the elevation above mean sea level, and these finally adjusted elevations should be stamped upon the permanent monuments set during the survey. Until such time, their elevations can be known from the lists published from time to time by Federal and State authorities, which publications are for gratuitous distribution.

After those quadrangles which are most densely populated, the section of the State containing our unexploited mineral wealth should receive priority in order of survey, but this is not a necessity; if there are special needs of the State to be served these may receive prior consideration. It

is necessary, however, to select for survey in any season quadrangles that have previously been primarily controlled.

It is recommended that the remaining appropriations be made uniformly \$25,000 per year. Thus far no two have been alike. \$25,000 was appropriated for 1901, \$20,000 for 1902, and \$30,000 for the work of 1903. This procedure to some extent disorganizes the personnel of the survey. The remaining work can be executed to somewhat better advantage if a uniform number of skilled topographers with their parties can be engaged each season.

APPENDIX A

LEGISLATION AND AGREEMENTS.

APPENDIX A.

H. B. No. 904, Passed April 16, 1900.

To make appropriations for the last three quarters of the fiscal year ending November 16, 1901, and the first quarter of the year ending February 15, 1902.

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That the following sums, for the purposes herein specified, are appropriated out of the moneys in the state treasury to the credit of the general revenue fund not otherwise appropriated, subject to draft on and after February 15, 1901, to-wit:

* * * * *

For co-operation with the United States Geological Survey in the preparation and completion of a contour topographic survey and map of this state, to be paid upon vouchers approved by the governor, and the governor is hereby authorized to arrange with the director or representative of the United States Geological Survey concerning this survey and map, its scale, method of execution, form and all details of the work in behalf of this state, and may accept or reject the work executed by the United States Geological Survey, the sum of..... \$25,000 00

And it is hereby provided that said map shall accurately show the outlines of all townships, counties and extensive wooded areas in this state as existing on the ground at the time of the execution of these surveys; the location of all roads, streams, canals, lakes and rivers; and shall show by contour lines the elevations and depression of the surface of the country, provided, further, that the state shall pay not to exceed one-half of the cost of survey as completed. * * * * *

A. G. REYNOLDS,
Speaker of the House of Representatives.
JNO. A. CALDWELL,
President of the Senate.

Passed April 16, 1900.

H. B. No. 1053, Passed May 12, 1902

An act to make appropriations for the last three quarters of the fiscal year ending November 15, 1902, and the first quarter of the fiscal year ending February 15, 1903.

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That the following sums, for the purposes herein specified, are appropriated out of any moneys in the state treasury to the credit of the general revenue fund not otherwise appropriated, to-wit: * * * * *

For co-operation with the United States Geological Survey, in the preparation and completion of a contour topographic survey and map of this state, the sum of twenty thousand dollars..... \$20,000 00

To be paid upon vouchers approved by the governor, and the governor is hereby authorized to see that such work is carried on as heretofore arranged with the representatives of the United States Geological Survey, and he may accept or reject the work executed by the United States Geological Survey; and if he finds it necessary to have an assistant in this work he may employ a competent person and pay him a reasonable compensation out of this appropriation. * * * * *

W. S. McKINNON,
Speaker of the House of Representatives.
F. B. ARCHER,
President of the Senate.

Passed May 12, 1902.

H. B. No. 1059, Passed May 12, 1902.

An act to make appropriations for the last three quarters of the fiscal year ending November 15, 1903, and the first quarter of the fiscal year ending February 15, 1904.

Be it enacted by the General Assembly of the State of Ohio:

SECTION 1. That the following sums, for the purposes herein specified, are appropriated out of any moneys in the state treasury to the credit of the general revenue fund not otherwise appropriated, subject to draft on and after February 16, 1903, to-wit:

* * * * *

For co-operation with the United States Geological Survey, in the preparation and completion of a contour topographic survey and map of this state, the sum of thirty thousand dollars..... \$30,000 00

To be paid upon vouchers approved by the governor, and the governor is hereby authorized to see that such work is carried on as heretofore arranged with the representatives of the United States Geological Survey, and he may accept or reject the work executed by the United States Geological Survey; and if he finds it necessary to have an assistant in this work he may employ a competent person and pay him a reasonable compensation out of this appropriation. * * * *

W. S. McKINNON,

Speaker of the House of Representatives.

F. B. ARCHER,

President of the Senate.

Senate Joint Resolution No. 15.

JOINT RESOLUTION.

Providing for the publication of the report of the Ohio co-operative topographical survey.

Be it resolved by the General Assembly of the State of Ohio: That the state printer be hereby authorized to print, as soon as practicable, twenty-five hundred copies of the report of the inspector of the Ohio co-operative topographic survey which comprises that information hitherto gathered by the survey and not published in map form, and covering the work of the survey from its inception to November 15, 1903.

That five copies of the same be sent to each member of the general assembly, one hundred copies be sent to the state library, one hundred copies be sent to the governor or his representative on the survey, and the remaining copies be deposited with the secretary of state for future distribution, provided, however, that no more than fifteen hundred copies including those distributed to the governor, library, and members of the general assembly, be distributed the first year.

GEORGE T. THOMAS,

Speaker of the House of Representatives.

GEO. H. CHAMBERLAIN,

President pro tem. of the Senate.

Adopted March 25, 1904.

43

AGREEMENT

Between the Governor of Ohio and the Director of the United States Geological Survey for the execution of the Co-operative Topographic Survey of the State of Ohio, as provided for in An Act (H. B. No. 904) Passed April 16th, 1900.

(1) The preparation of the map shall be under the supervision of the Director of the United States Geological Survey, who shall determine the methods of survey and map construction.

(2) The order in which, in point of priority, different parts of the state shall be surveyed, shall be agreed upon in detail by the Governor of Ohio and the Director of the United States Geological Survey.

(3) The work shall be based upon the triangulation of the United States Coast and Geodetic Survey, and the United States Lake Survey, and wherever such primary control is deficient it shall be supplemented by the Co-operative Topographic Survey, which shall permanently monument all important positions.

(4) The survey shall be executed in a manner sufficiently elaborate to prepare a map upon a scale of 1:62,500 exhibiting the hydrography, hypsography and public culture, and all town and county boundary lines and township land lines, as marked upon the ground at the time of its completion in form similar to sheets already completed in this state. The preliminary field maps shall be on such scale as the Director of the United States Geological Survey may select to secure accuracy in the construction of the final map.

(5) The hypsography shall be shown by contour lines with a vertical interval of twenty feet.

(6) The heights of important points shall be determined and furnished to the Governor of the state.

(7) The outlines of wooded areas shall be represented upon proofs of the engraved map to be furnished the Governor of the state.

(8) For convenience the United States Geological Survey shall, during the progress of the field work, pay the salaries of the permanent employes engaged thereon, while the traveling, subsistence and field expenses shall be paid for the same time by the state. For office work on the map the salaries shall be divided between the two agreeing parties in such a way as to equalize all expenses, provided that the total cost to the State of Ohio of the field and office work shall not be more than twenty-five thousand dollars (\$25,000.00), and provided that the United States Geological Survey shall expend an equal amount upon the work.

(9) During the progress of the work, free access to the field sheets and records of the topographers and draftsmen shall be afforded the Governor or his representative for examination and criticism; and should the said Governor of Ohio deem that the work is not being executed in a satisfactory manner, then he may, on formal notice, terminate this agreement.

(10) The resulting map shall fully recognize the co-operation of the State of Ohio.

(11) When the work is completed, the Governor of the State of Ohio shall be furnished by the United States Geological Survey with photographic copies of the manuscript sheets; and when the engraving is completed and at all times thereafter when desired, he shall be furnished by the said survey with transfers from copper plates of the map for use in printing editions of said maps.

Columbus, Ohio, November 24, 1900.

GEO. K. NASH,
Governor of the State of Ohio.

CHAS. D. WALCOTT,

Washington, D. C., November 26, 1900. Director United States Geological Survey.

APPENDIX B

EXPENDITURES ON QUADRANGLES.

1901	Sandusky, Ottawa, Seneca.....	Fremont.....	Tyler, Jr.....	35	224	....	6	267	1211	734	1620
1901	Eric, Sandusky, Huron, Seneca, Ottawa	Bellevue.....	Tyler, Jr.....	29	183	....	5	217	983	595	1315
1901	Eric, Huron, Ottawa.....	Sandusky.....	Tyler, Jr.....	25	161	....	4	192	855	526	1163
1901	Ottawa.....	Put-in-Bay.....	Tyler, Jr.....	8	38	....	2	47	226	119	286
1901	Delaware, Marion, Morrow, Union.....	Delaware.....	Duke.....	74	228	....	8	426	108	583	2329
1901	Delaware, Union, Franklin, Madison.....	Dublin.....	Griffin.....	79	228	....	7	180	288	774	2110
1901	Lorain, Erie, Huron.....	Vermilion.....	Goodlove.....	30	146	50	9	488	3968	336	1187
	Total Ohio completely mapped, 1901.....			870	3620	544	118	3638	15,258	12,323	30,987
1901	Medina.....	Medina.....	Munroe.....	....	....	170	....	26	79	....	106
1901	Harrison, Carroll.....	Scioto.....	Grissold.....	....	....	....	6	162	540	596	1330
1901	Cuyahoga, Lorain.....	Berea.....	Cummin.....	....	....	....	....	207	580	431	427
1901	Cumbiana, Jefferson, O., Hancock, W. Va., Beaver Pa.....	Wellsville.....	Sutton.....	5	18	5	....	16	75	64	....
	Unfinished in field, 1901, Ohio, only.....			5	18	175	6	411	1274	1091	1863
	Grand total for 1901.....			875	3638	719	124	4049	16,532	13,414	32,850

* In 1883 and 1890, Messrs. Shumway and Fletcher surveyed Huntington sheet, scale 1:125,000, contour interval 100 feet. The Ohio portion of this, 49 square miles, was resurveyed on the Guyandot sheet on the larger scale, 1:62,500, contour interval 20 feet, by Mr. Morrill in 1901. The Huntington sheet was published and engraved.

† In 1901 the Kenova sheet was partially mapped on the scale of 1:125,000, contour interval 100 feet, and in the same year the Ohio portion of this, 40 square miles, was mapped on the scale of 1:62,500, contour interval 20 feet, by Mr. Morrill, and was given the name of Ceredo quadrangle. The Kenova sheet, covering portions of West Virginia and Kentucky, was not completed.

‡ The survey of the Ironton sheet was commenced in 1897 on a scale of 1:125,000 and with a contour interval of 50 feet. That sheet was not completed, nor has it been engraved, for on the following year, 1898, the southeast quarter of that sheet was resurveyed on the larger scale of 1:62,500, contour interval 20 feet, and has been published under the name of the Ironton sheet. On the original mapping 285 square miles were sketched.

Years.	Counties.	Sheets.	Topographers.	Number of Days Worked.	Area Mapped, Square Miles.	Trigonometric Locations, Number.	Spirit Leveling.			Traverse-Miles, Number.	Total Cost, Field Work Only.
							Bench Marks, Number.	Miles, Number.	Elevations, Number.		
1902	Harrison, Carroll.	Scioto.	Griswold.	129	227	10	1	108	554	38	1394
1902	Cuyahoga, Lorain.	Berea.	Cummin.	45	218	...	...	75	302	28	873
1902	Belmont, O., Marshall, W. Va., Washington, Green, Pa.	Cameron.	Brown.	1	1	...	...	1	3	44	...
1902	Washington, Morgan, O., Wood, W. Va.	Parkersburg.	Morrill.	39	193	85	4	186	857	627	1650
1902	Wood, Ritchie, Pleasant, W. Va., Washington, O.	Marletta.	Morrill.	33	116	45	3	105	534	471	848
1902	Columbiana, Jefferson, O., Hancock, W. Va., Beaver, Pa.	Wellsville.	Manning.	43	146	46	5	144	677	576	2657
1902	Franklin, Delaware, Licking.	Westerville.	Griffin.	51	228	...	8	495	610	523	1875
1902	Jefferson, O., Hancock, Brooke, W. Va.	Steubenville.	Cooke.	38	126	50	4	208	517	485	996
	Total Ohio completely mapped, 1902.			379	1255	236	25	1322	4054	2752	10,293
1902	Belmont, Guernsey, Harrison.	Flushing.	Griswold.	...	...	40	5	167	710	501	1505
1902	Washington, Noble, Monroe.	Macksburg.	Morrill.	...	...	91	...	...	...	...	316
1902	Washington, Monroe.	New Mamoras.	Blair, Sadler.	6	35	...	...	...	281	151	688
1902	Jefferson, Columbus, Carroll.	St. Charles.	Manning, McCoy.	27	207	207	7	434	1288	664	3092
1902	Belmont, Harrison, Jefferson.	St. Charles.	Griswold, Nunn.	98	156	95	6	443	2042	754	2964
1902	Noble, Guernsey, Monroe, Belmont.	Woodsfield.	Griffin.	...	4	...	...	...	...	185	420
1902	Belmont, Monroe, O., Marshall, W. Va.	Clarington.	Griffin.	3	...	...	8	471	881	510	2620
	Unfinished in field, 1902, Ohio.			116	222	433	26	1613	5202	2765	11605
	Grand total for 1902.			495	1477	669	51	2935	9256	5517	21898

Years.	Counties.	Sheets.	Topographers.	Number of Days Worked.	Area Mapped—Square Miles.	Trigonometric Locations, Number.	Spirit Leveling.			Travel—Miles, Number.	Total Cost, Field Work Only.
							Bench Marks, Number.	Miles, Number.	Elevations, Number.		
1903	†Belmont, Guernsey, Harrison.....	Flushing	Griswold, Munn, Coe.....	76	228	40	.....	337	2017	44	1670
1903	Belmont, Monroe, O., Marshall, W. Va.....	Clarington.....	Griffin, Bebb, Birdseye, Duke.....	74	177	.....	.....	.....	.....	.....	708
1903	Guernsey, Noble, Belmont, Monroe.....	Woodsfield.....	Griffin, Hannegan, McGowan, Birdseye, Griffin, Sadler.....	84	229	104	9	484	414	438	3250
1903	Butler, Hamilton.....	Hamilton.....	Griffin, Sadler.....	39	231	.....	8	591	430	885	1889
1903	Monroe, Washington.....	New Matamoras.....	Manning, Lloyd, Sadler.....	52	183	542	6	979	2134	705	4211
1903	Athens, Morgan, Hocking.....	Athens.....	Manning, Johnson, Anderson.....	94	231	345	10	558	2845	1059	5044
1903	Washington, Monroe, Noble.....	Macksburg.....	Goodlove, Hackett, Birds-eye.....	64	230	267	20	620	4725	983	5730
1903	Marion, Wyandot, Crawford.....	Marion.....	Hackett, Birds-eye.....	58	227	.....	13	596	2093	630	2893
1903	Columbiana, Jefferson, Carroll.....	Salineville.....	Johnston, McCoy.....	76	200	.....	.....	.....	.....	20	638
1903	Summit, Medina.....	Akron.....	Hannegan, Goodlove.....	46	225	.....	14	351	1702	494	2806
1903	Summit, Portage.....	Kent.....	Hannegan, Goodlove.....	33	225	.....	11	378	2669	1230	2610
1903	Ashtabula.....	Ashabula.....	Cummin, Coe.....	21	117	.....	8	211	364	348	1074
1903	Lake.....	Madison.....	Cummin.....	7	53	.....	4	169	656	368	547
1903	Lake, Geauga, Cuyahoga.....	Mentor.....	Goodlove, Cummin, Coe.....	30	184	.....	11	290	763	684	2061
1903	Meigs, Athens, Washington, O., Wirt, Wood, Jackson, W. Va.....	Belleville.....	Morrill.....	3	10	6	.....	14	58	33	136
1903	Monroe, O., Wetzel, Tyler, Marshall, W. Va.....	New Martinsville.....	Morrill, McMillan.....	16	80	77	1	146	464	348	938

In the columns of cost, only the actual expenditure of the field force upon their work has been entered. In addition heavy expense was incurred in office drafting, for freight, transportation, and other miscellaneous charges, which were paid through the office, so that in each case the total expenditures per sheet and the gross expenditure averages nearly twenty-five per cent. less than the actual total cost of making the topographic survey.

Years.	Counties.	Sheets.	Topographers.	Number of Days Worked.	Area Mapped—Square Miles.	Trigonometric Locations, Number.	Spirit Leveling.				Traverse-Miles, Number.	Total Cost, Field Work Only.
							Bench Marks, Number.	Miles, Number.	Elevations, Number.			
1903	Belmont, Harrison, Jefferson.....	St. Clairsville.....	Munn	34	72	....	7	14	90	10	257	
	Total Ohio completely mapped, 1903.....			807	2902	1381	122	5738	21,424	8329	36,462	
1903	Butler, Warren, Hamilton	Bethany	Griffin .....	....	....	....	8	444	331	722	1166	
1903	Athens, Washington, Morgan	Cutler	Manning .....	....	....	292	4	245	1355	648	1684	
1903	Montgomery, Greene, Miami, Clark	Dayton	Manning .....	....	....	....	13	61	544	685	794	
1903	Allen, Auglaize	Lima	Manning .....	....	....	....	13	85	529	685	831	
1903	Fayette, Madison, (Ross), Pickaway	Mt. Sterling	Manning .....	....	....	....	15	96	391	487	671	
1903	Vinton, Hocking, Athens	Orland	Manning .....	....	....	13	11	82	428	7	211	
1903	Clark, Greene	Springfield	Manning .....	....	....	....	....	....	....	688	1111	
1903	Washington, O., Pleasant, Tyler, Ritchie, W. Va.	St. Marys	Walker, Morrill, Eakin .....	....	....	59	6	101	448	52	699	
1903	Crawford, Wyandot	Sycamore	Manning, Hackett, Birdseye .....	....	115	....	9	550	3308	688	2362	
1903	Seneca	Tiffin	Manning .....	....	....	....	8	376	2150	649	1100	
	Unfinished in field, 1903, Ohio			36	115	364	87	2040	9484	5282	10,629	
	Grand total for 1903			843	3017	1745	209	7778	30,908	13,611	47,091	

APPENDIX C

TOPOGRAPHIC MAPS ENGRAVED, IN PROCESS OF EN-
GRAVING, SURVEYED, AND PARTLY SUR-
VEYED. NOVEMBER 15, 1903.

In the column headed "Topographer" in the list following is given the names of persons engaged in contour sketching on the quadrangles instanced.

TOPOGRAPHIC MAPS ENGRAVED AND PRINTED.

Quadrangle.	Counties.	Surveyed.	Topographer.
Bellevue.....	Erie, Sandusky, Ottawa, Huron, Seneca.	1901	Tyler, Jr.
Bowling Green....	Wood, Lucas.....	1901	Cooke.
Cadiz.....	Jefferson, Carroll, Harrison.....	1901	Griswold.
Canton.....	Stark, Summit, Portage.....	1901	Munroe.
Cleveland.....	Cuyahoga, Summit, Medina.....	1901	Cummin.
Delaware.....	Delaware, Marion, Morrow, Union.....	1901	Duke.
Dublin.....	Franklin, Delaware, Union, Madison....	1901	Griffin.
East Cincinnati...	Hamilton, Clermont.....	1898	Cooke.
East Columbus...	Franklin, Fairfield, Pickaway, Licking..	1899	Munroe.
Elmore.....	Sandusky, Wood, Ottawa, Seneca.....	1901	Cooke.
Euclid.....	Cuyahoga.....	1901	Cummin.
Fremont.....	Sandusky, Ottawa, Seneca.....	1901	Tyler, Jr.
Findlay.....	Hancock, Wood.....	1901	Cooke.
Fostoria.....	Seneca, Hancock, Wood.....	1901	Cooke.
Ironton.....	Scioto, Lawrence,.....	1897	Munroe, Smith.
		1898	Morrill.
Guyandot.....	Lawrence.....	1901	Morrill.
Massillon.....	Wayne, Summit, Stark, Medina.....	1901	Munroe.
Maumee Bay.....	Lucas, Ottawa, Wood.....	1899	Cooke.
Oberlin.....	Lorain.....	1901	Cummin.
Oak Harbor.....	Ottawa, Lucas.....	1899	Cooke.
Put-in-Bay.....	Ottawa.....	1901	Tyler, Jr.
Sandusky.....	Erie, Huron, Ottawa.....	1901	Tyler, Jr.
Toledo.....	Lucas, Wood.....	1899	Cooke.
Vermilion.....	Lorain, Erie, Huron.....	1901	Goodlove.
West Cincinnati..	Hamilton.....	1898	Cooke.
West Columbus..	Franklin, Pickaway, Madison.....	1899	Munroe.
Wheeling.....	Jefferson, Belmont.....	1901	Hall, Harper.
Wooster.....	Wayne, Medina.....	1901	Munroe.

TOPOGRAPHIC SHEETS IN PROCESS OF ENGRAVING.

Quadrangle.	Counties.	Surveyed.	Topographer.
Berea.....	Cuyahoga, Lorain, Medina.....	1901	Cummin.
		1902	
Cameron.....	Belmont.....	1902	Brown.
Marietta.....	Washington.....	1902	Morrill.
Parkersburg.....	Washington, Morgan, Athens.....	1902	Morrill.
Scio.....	Harrison, Carroll.....	1901	Griswold.
		1902	
Steubenville.....	Jefferson.....	1902	Cooke.
Wellsville.....	Columbiana, Jefferson.....	1902	Manning.
Westerville.....	Franklin, Delaware, Licking.....	1902	Griffin.

QUADRANGLES COMPLETELY SURVEYED.

Quadrangle.	Counties.	Surveyed.	Topographer.
Akron.....	Summit, Medina.....	1903	Hannegan, Goodlove.
Ashtabula.....	Ashtabula.....	1903	Cummin, Coe.
Athens.....	Athens, Morgan, Hocking.....	1903	Manning, Johnson, Anderson.
Belleville.....	Athens, Washington, Meigs.....	1903	Morrill.
Clarington.....	Belmont, Monroe.....	1902	Griffin, Bebb,
Flushing.....	Belmont, Harrison, Guernsey.....	1903	Duke, Birdseye.
Hamilton.....	Butler, Hamilton.....	1902	Griswold, Munn,
*Kent.....	Portage, Summit.....	1903	Coe.
Macksburg.....	Washington, Noble, Monroe.....	1903	Griffin, Sadler.
Madison.....	Lake.....	1902	Goodlove,
Marion.....	Marion, Wyandot, Crawford.....	1903	Hannegan.
Mentor.....	Lake, Geauga, Cuyahoga.....	1903	Goodlove.
New Martinsville.	Monroe.....	1903	Hackett.
New Matamoras..	Monroe, Washington.....	1903	Cummin.
St. Clairsville....	Belmont, Harrison, Jefferson.....	1902	Hackett,
Salineville.....	Columbiana, Carroll, Jefferson.....	1903	Birdseye.
Woodsfield.....	Belmont, Monroe, Noble, Guernsey.....	1902	Goodlove,
		1903	Cummin, Coe.
			Morrill.
			Manning,
			Lloyd, Saddler.
			Griswold,
			Munn.
			Manning,
			Johnson, McCoy.
			Griffin, McCoy,
			Hannegan,
			Saddler,
			Birdseye.

QUADRANGLES PARTLY SURVEYED.

Quadrangle.	Counties.	Surveyed.	Topographer.
Bethany.....	Butler, Warren, Hamilton.....	1903	Morrill.
Ceredo.....	Lawrence.....	1901	
Cutler.....	Athens, Washington, Morgan.....	1903	
Dayton.....	Montgomery, Miami, Clark, Greene.....	1903	
Lima.....	Allen, Auglaize, Logan.....	1903	Hackett.
Mt. Sterling.....	Fayette, Madison, Pickaway, Ross.....	1903	
Orland.....	Vinton, Hocking, Athens.....	1903	
Springfield.....	Clark, Greene.....	1903	
St. Marys.....	Washington.....	1903	
Sycamore.....	Wyandot, Crawford, Seneca.....	1903	
Tiffin.....	Seneca.....	1903	
			Birdseye.

*Not quite completed.

APPENDIX D

LIST OF PRIMARY TRIANGULATION STATIONS.

CENTRAL SECTION OF TOPOGRAPHY.

OHIO.

TRIANGULATION STATIONS.

Postions in eastern Ohio published herewith result from the field work of Messrs. W. T. Griswold in 1900, A. H. Thompson in 1901, and G. T. Hawkins and S. S. Gannett in 1902.

Previous to the latter date positions depended upon Maryland Heights and Sugar Loaf stations of the United States Coast and Geodetic Survey, near Harpers Ferry, W. Va., but during the season of 1902 Mr. Gannett extended a belt of triangulation from Wray-Gebhardt stations in the transcontinental belt of United States Coast and Geodetic Survey near Huntington, W. Va., up the Ohio River and connected with previous work near Parkersburg, W. Va.

The discrepancy in latitude and longitude was distributed arbitrarily so as not to disturb figure adjustments, and has been applied so as to reduce all positions to the U. S. standard datum as derived from Wray-Gebhardt.

BOND, ATHENS COUNTY.

On a flat ridge covered with fruit trees in Carthage township, 7 miles southeast of Guysville. Station is on eastern edge of summit, about 4 feet lower and 200 feet east of highest point, on land owned by William Bond, who lives 300 yards south.

Station mark: A sandstone post 38 by 9 by 9 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 14' 17.07''$. Longitude $81^{\circ} 51' 10.74''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Fulton.. .. .	106 34 55.98	286 28 31.40	4.1818210
White	129 06 44.67	308 58 43.68	4.3696920
Southland... ..	179 06 54.47	359 06 47.89	4.2068403
Nolan.....	226 08 49.91	46 14 13.62	4.2298152
Lyons.....	247 00 38.53	67 02 55.00	3.7495497
Wigal.....	290 51 25.79	110 58 02.69	4.2074866
Melhorn.....	335 49 20.01	155 53 06.15	4.3227202

FULTON, ATHENS COUNTY.

A bare hogback ridge in Lodi township, 7 miles southeast of Athens. Land owned by William Fulton.

Station mark: A sandstone post 36 by 12 by 12 inches, dressed 8 inches square on top, set 34 inches in the ground; in the center of top is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 16' 37.29". Longitude 82° 01' 18.47".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Townsend (2).....	103 28 43.53	283 25 56.81	3.8121631
White.....	160 49 23.38	340 47 47.32	4.0432222
Southland.....	230 29 38.61	50 35 57.22	4.2678598
Bond.....	286 28 31.40	106 34 55.98	4.1818210

LYONS, ATHENS COUNTY.

A bald hill in Troy township, 1 mile north of Latrobe postoffice (Coolville station). Land owned by Eli Lyons, who lives 200 yards southeast of station. A good view in nearly all directions excepting northward, which is limited to 2 miles.

Station mark: A marble post 30 by 6 by 6 inches set 28 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 15' 28.16". Longitude 81° 47' 35.04".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Bond.....	67 02 55.00	247 00 38.53	3.7495497
Nolan	216 30 09.55	36 33 16.71	4.0753794
Wigal.	308 45 37.51	128 49 58.11	4.1032825
Melhorn.....	350 53 46.66	170 55 16.63	4.3354363

NEBO, ATHENS COUNTY.

A small knob in Dover township, 6 miles by road north of Athens, owned by the Hibbard heirs. Summit covered with a peach orchard (trees mostly dead). A fine view can be had in all directions excepting

eastward. The station was selected and occupied by the United States Coast and Geodetic Survey in 1881.

Station mark: A marble post 30 by 6 by 6 inches set 30 inches in the ground over a square earthen pyramid 5 inches high. Top of post

is marked,

U.	S.
C. &	G. S.

[Latitude 39° 24' 29.53". Longitude 82° 05' 13.90".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Townsend (2).....	2 55 47.28	182 55 29.61	4.1162949
McDaniel.....	83 24 56.70	263 16 04.46	4.3054151
Brooks.....	124 00 23.75	303 54 52.42	4.1770814
White.....	334 05 08.78	154 06 01.99	3.6620298

SOUTHLAND, ATHENS COUNTY.

On a flat cultivated ridge owned by W. A. Wagoner, 2 miles north-east of Broadwell postoffice, in eastern central part of the county, one-fourth mile west of the Washington county line.

Station mark: A sandstone post 44 by 8 by 8 inches set 40 inches in the ground, just south of fence about 60 yards east of brick house and on opposite side of road. In center of top of post is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 22' 59.09". Longitude 81° 51' 21.13".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Fulton.....	50 35 57.22	230 29 38.61	4.2678598
White.....	85 47 06.32	265 39 11.18	4.2546960
Nolan.....	289 09 05.68	109 14 36.48	4.1212888
Bond.....	359 06 47.89	179 06 54.47	4.2068403

TOWNSEND (2), ATHENS COUNTY.

In Athens township, 3 miles by road south of Athens, on a flat cultivated ridge owned by Mary Townsend. Station about 50 yards east of a north and south road and 32 feet west of line fence.

Station mark: A limestone post 30 by 6 by 6 inches set 28 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 17' 26.25". Longitude 82° 05' 41.78"]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McKnight.....	29 45 53.05	209 42 32.43	4.1858081
Zaleski.....	81 38 31.23	261 26 53.85	4.4264864
McDaniel.....	118 57 19.04	298 48 45.11	4.3458525
Nebo.....	182 55 29.61	2 55 47.28	4.1162949
White.....	196 40 59.96	16 42 10.77	3.9691971
Fulton.....	283 25 56.81	103 28 43.53	3.8121631
Greenler.....	359 42 36.35	179 42 39.02	4.3021055

WHITE, ATHENS COUNTY.

On a small knob 4 miles northeast of Athens, near the corner of Athens, Canaan, Ames, and Dover townships. The station is in Canaan township, on land owned by D. C. White, 5.5 feet east of the southeast corner of a private cemetery, which occupies the summit of knob.

Station mark: A sandstone post 36 by 14 by 7 inches set 34 inches in ground. In center of top is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 22' 15.58". Longitude 82° 03' 50.06".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Townsend (2).....	16 42 10.77	196 40 59.96	3.9691971
McDaniel.....	94 42 43.35	274 32 58.10	4.3453947
Nebo.....	154 06 01.99	334 05 08.78	3.6620298
Southland.....	265 39 11.18	85 47 06.32	4.2546960
Bond.....	308 58 43.68	129 06 44.67	4.3696920
Fulton.....	340 47 47.32	160 49 23.38	4.0432222

CENTENNIAL, BELMONT COUNTY.

(Secondary Station.)

Situated 2½ miles northwest of the city of Bellaire, on land owned by William Nichol.

Station mark: A lone pine tree on highest point of hill.

[Latitude 40° 02' 19.01". Longitude 80° 46' 27.91".]

To station--	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Myers.....	31 55 37.0	211 54 17.4	3.7445933
Sherrard.....	304 01 30.3	124 04 47.5	3.9432353

CLARKS HILL, BELMONT COUNTY.

Situated 1 mile east of Brannock station, south of the Cleveland, Lorain, and Wheeling Railway, on the summit of a hill owned by the heirs of Mr. Samuel Clark.

Station mark: A cut marble post 6 by 6 inches on top and extending to 6 by 12 inches at bottom. It is 24 inches long, sunk 25 inches in the ground, and set in cement. In the center of the top is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 06' 18.28". Longitude 80° 57' 45.02".]

To station--	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Gallaway.....	4 07 10.89	184 06 50.55	4.0183310
Cadiz.....	170 13 03.93	350 11 27.43	4.3177623
Mount Pleasant.....	257 20 13.51	77 26 58.01	4.1827579

GALLAWAY, BELMONT COUNTY.

Situated 4 miles southeast of Belmont and 2 miles south of Lewis Mills, on the summit of a bare hill owned by Mr. Gallaway.

Station mark: A cut marble post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 00' 40.94". Longitude 80° 58' 16.52".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Beallsville.....	2 29 55.83	182 29 34.33	4.2612655
Clarks Hill.....	184 06 50.55	4 07 10.89	4.0183311
Mount Pleasant.....	228 38 05.78	48 45 10.24	4.3180322
Myers.....	276 53 33.03	96 59 49.03	4.1453970
Jacobsburg.....	299 35 16.63	119 38 37.92	3.9318086
Newcastle.....	32 41 30.82	212 37 30.44	4.2166459
Bryan.....	60 34 11.06	240 30 53.45	3.9231502

JACOBSBURG, BELMONT COUNTY.

Situated on the top of Mr. Robert C. McKelvey's house. Signal was placed on roof within railing. The center comes at edge of second layer of tin from south railing and in center of cupola east and west.

[Latitude 39° 58' 24.01" Longitude 80° 53' 03.37".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Beallsville.....	30 28 36.52	210 24 54.13	4.2108474
Gallaway.....	119 38 37.92	299 35 16.63	3.9318086
Myers.....	248 31 07.18	68 34 01.77	3.8405264

MOUNT PLEASANT, BELMONT COUNTY.

Situated near Morningview postoffice, on the north end of a bare hill on the west side of the Wheeling and Mount Pleasant pike, on land owned by Mr. Goff.

Station mark: A cut marble post 40 by 6 by 6 inches set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 08' 06.07". Longitude 80° 47' 16.28".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Myers.....	6 32 00.56	186 31 12.65	4.1908702
Gallaway.....	48 45 10.24	228 38 05.78	4.3180322
St. Clairsville.....	58 03 07.29	237 58 45.00	4.0555471
Clarks Hill.....	77 26 58.01	257 20 13.51	4.1827579
Cadiz Court-house.....	130 39 47.88	210 31 40.34	4.3715300
Cadiz.....	133 05 59.66	312 57 37.85	4.4004381
Hopedale.....	165 20 26.93	345 17 50.68	4.3534510
New Alexander.....	207 17 14.17	27 21 07.51	4.2700856
Independence.....	238 17 59.54	58 27 33.56	4.3938130
West Liberty.....	252 09 09.19	72 16 23.96	4.2241846
Sherrard.....	331 35 42.42	151 39 31.51	4.2492017

MYERS, BELMONT COUNTY.

Situated 4 miles southwest of the city of Bellaire, on a cleared knob on land owned by Mr. P. B. Myers.

Station mark: A cut marble post 48 by 6 by 6 inches set 40 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 59' 46.16". Longitude 80° 48' 31.67".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Beallsville.....	41 39 03.80	221 32 26.97	4.3447990
Jacobsburg	68 34 01.77	248 31 07.18	3.8405264
Gallaway.....	96 59 49.03	276 53 33.03	4.1453970
Mount Pleasant.....	186 31 12.65	6 32 00.56	4.1908702
Centennial.....	211 54 17.38	31 55 36.99	3.7445900
Clinton	224 11 47.70	44 17 52.97	4.2850900
Sherrard	271 04 45.82	91 09 22.42	4.0090858
Riggs.....	344 41 46.06	164 43 47.81	4.2327314

BARNESVILLE SCHOOLHOUSE, BELMONT COUNTY.

(Not occupied.)

High school in village of Barnesville, Warren township.

Station mark: Center of cupola.

[Latitude 39° 59' 21.42". Longitude 81° 10' 45.33".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Steele.....	80 40 36.44	260 38 36.77	3.6510482
Newcastle.....	322 02 20.19	142 06 20.66	4.1604334

BRYAN, BELMONT COUNTY.

Situated on a high, partially cleared hill in Goshen township, about 2 miles north of Hunter postoffice and 4 miles a little east of south of Bethesda. Land owned by Mr. Patterson.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The tall dead signal tree on highest part of hill. Distance from station mark, 6 feet; true azimuth 355° 13'.

[Latitude 39° 58' 27.33". Longitude 81° 03' 23.94".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Newcastle.....	9 15 31.48	189 14 48.57	3.9944416
Steele.....	93 39 27.39	273 33 44.12	4.1738583
Gallaway.....	240 30 53.44	60 34 11.06	3.9231502
Beallsville.....	335 13 05.87	155 16 01.67	4.1914760

FLUSHING, BELMONT COUNTY.

(Not occupied.)

In village of Flushing, in township of same name.

Station mark: Center of cupola on Dr. Burraclough's house.

(Latitude $40^{\circ} 08' 58.90''$. Longitude $81^{\circ} 03' 50.24''$.)

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sewellsville.....	65 25 32.21	245 19 39.26	4.1542888
Prospect Hill.....	126 53 21.86	306 47' 57.45	4.1720159

NEWCASTLE, BELMONT COUNTY.

Situated on a high, cleared hill in Wayne township, about one-half mile southeast of the village of Newcastle. Land owned by Benjamin Pitman.

Station mark: A stone post 30 by 6 by 6 inches set 30 inches in the ground on solid rock, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The tall poplar signal tree; distance from station mark, 8.15 feet; true azimuth $67^{\circ} 49'$.

[Latitude $39^{\circ} 53' 11.37''$. Longitude $81^{\circ} 04' 30.75''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wiedman.....	61 08 38.37	241 04 21.24	4.0370559
Steele.....	128 47 53.71	308 41 53.72	4.2323159
Bryan.....	189 14 48.57	9 15 31.48	3.9944416
Gallaway.....	212 37 30.44	32 41 30.82	4.2166459
Beallsville.....	298 18 11.29	118 21 49.78	3.9639688

SEWELLSVILLE, BELMONT COUNTY.

Situated on the summit of a high, sharp hill in the village of Sewellsville, Kirkwood township. Land owned by J. R. Shepherd.

Station mark: A stone post 40 by 6 by 6 inches, set 36 inches in the ground, in the center of the top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 05' 46.19". Longitude 81° 12' 57.88".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Steele.....	5 46 28.38	185 45 53.85	4.1023371
Warehime.....	43 11 35.43	223 05 20.85	4.3052324
McBride.....	112 07 52.73	292 03 17.71	4.0377941
Tippecanoe.....	167 35 37.71	347 33 48.12	4.2714644
Prospect Hill.....	184 05 36.80	4 06 05.81	4.1729676
Deersville.....	186 18 29.97	6 19 40 83	4.3730446
Cadiz.....	219 59 50.71	40 08 03.66	4.4482271

STEELE, BELMONT COUNTY.

Situated on a high, cleared hill in Warren township, about 3 miles west of Barnesville and a few feet east of the Guernsey county line. Land owned by Isaac Steele.

Station mark: A stone post 36 by 6 by 6 inches set 30 inches in the ground and resting on solid rock. In center of top of post is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 58' 57.84". Longitude 81° 13' 51.50".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Calland.....	21 39 25.88	201 35 53.45	4.3293954
Tucker.....	46 59 57.57	226 53 52.54	4.2667725
Warehime.....	80 21 27.72	260 15 48.06	4.1047692
McBride.....	152 07 18.16	332 03 18.01	4.2763262
Sewellsville.....	185 45 53.85	5 46 28.38	4.1023371
Bryan.....	273 33 44.12	93 40 27.39	4.1738583
Beallsville.....	305 01 44.45	125 11 13.00	4.4179181
Newcastle.....	308 41 53.72	128 47 53.71	4.2323159
Wiedman.....	346 36 44.38	166 38 26.80	4.2146469

PRELIMINARY REPORT ON THE
ST. CLAIRSVILLE COURT HOUSE, BELMONT COUNTY.

(Not occupied.)

Station mark: Center of cupola on court house.

[Latitude 40° 04' 50.90". Longitude 80° 54' 04.27".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Mount Pleasant.....	237 58 45.00	58 03 07.29	4.0555471
Sherrard.....	297 53 05.27	118 01 16.04	4.3112543

CARROLLTON, CARROLL COUNTY.

Situated 2½ miles east of the town of Carrollton, on the Scroggsfield road, on land owned by Mr. Campbell.

Station mark: A cut marble post 40 by 6 by 6 inches set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 34' 35.51". Longitude 81° 01' 47.82".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kensington.....	204 06 05.89	24 09 27.05	4.2491471
Elders.....	262 50 29.70	82.57 51 91	4.2070630
Jefferson....	340 45 32.78	160 48 24.64	4.2772402

KENSINGTON, CARROLL COUNTY.

Situated 1 mile south of Kensington on the highest point of a wooded hill. A county road passes over the south side of the hill.

Theodolite elevated 60 feet.

Station mark: A cut marble post 48 by 6 by 6 inches, sunk 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 43' 20.61". Longitude 80° 56' 39.07".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Carrollton.....	24 09 27.05	204 06 05.89	4.2491471
Hammond.....	283 34 21.24	103 44 59.61	4.3739205
Elders.....	328 26 39.02	148 30 40.69	4.2218375

PERRYVILLE, CARROLL COUNTY.

(Not occupied.)

Station mark: Center of church spire.

[Latitude 40° 27' 54.90". Longitude 81° 05' 53.49".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Jefferson.....	294 32 31.88	114 38 03.15	4.1217691
Cadiz.....	337 39 22.36	157 43 02.21	4.3238587

EAST LIVERPOOL CHAPEL, COLUMBIANA COUNTY.

(Not occupied.)

Memorial Chapel in the cemetery at East Liverpool, Ohio.

Station mark: Cap on monument of soldier.

[Latitude 40° 38' 15.62". Longitude 80° 34' 22.70".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Hammond.....	114 30 16.57	294 26 23.76	3.96492
Allison.....	353 41 30.73	173 41 45.23	3.67712

HAMMOND, COLUMBIANA COUNTY.

Situated 2 miles east of the village of Glasgow on the highest point of a knob, known locally as Hammonds Knob.

Station mark: A cut marble post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 40' 19.50". Longitude 80° 40' 20.06".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wintersville.....	9 29 54.97	189 27 36.41	4.4836287
Elders.....	58 57 24.93	238 50 48.93	4.2224370
Kensington.....	103 44 59.61	283 34 21.24	4.3739205
Allison.....	313 44 30.76	133 48 37.93	4.0918031

WIDDER, COSHOCTON COUNTY.

On land owned by Mr. Charles Widder, 2½ miles nearly south of Newcomerstown, 50 feet west of north and south road, 1½ miles west of Baptist church, and 600 feet southwest of White schoolhouse.

Station mark: A sandstone post 36 by 6 by 6 inches set 36 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 14' 09.67". Longitude 81° 36' 54.11".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kennedy.....	32 21 19.42	212 17 49.89	4.1574000
Wasen.....	184 22 07.82	4 22 43.79	4.2359074
Stone Creek.....	198 41 15.69	18 43 44.26	4.2281117
Port Washington.....	226 23 39.00	46 27 45.00	4.0942600
Gilmore.....	245 08 36.06	65 15 18.37	4.2095562
Booth.....	283 15 05.76	103 17 39.33	3.7615799
Midway.....	337 39 01.10	157 42 44.98	4.3353514

BUCK, FAIRFIELD COUNTY.

On the farm of Noah Seifert, 7 miles east-southeast of Lancaster, in the southwest part of section 13, Berne township, on a small mound in a cleared field 100 feet north of the east and west road which crosses summit of hill. Timber obstructs view to the southwest.

Station mark: A marble post 30 by 6 by 6 inches set 28 inches in the ground, over an earthenware pyramid.

[Latitude 39° 40' 44.49". Longitude 82° 30' 07.18".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Brown.....	34 23 53.61	214 20 02.08	4.1858328
B. I. S. chimney.....	68 40 43.74	248 35 57.26	4.0607701
B. I. S. water tower.....			4.0605764
Pleasant(2).....	122 42 18.23	302 38 44.12	3.9771162
Cook.....	318 30 42.80	138 36 43.24	4.3091667
Schultz.....	338 54 01.46	158 57 18.49	4.3120770

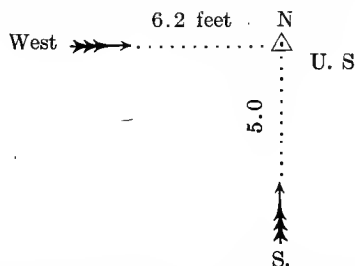
PLEASANT (2), FAIRFIELD COUNTY.

On summit of a bluff, locally called Mount Pleasant, about 300 feet above and 1 mile north of Lancaster, Ohio. Immediately east of fair grounds, on land owned by F. J. Buschemeyer.

Station mark: Center of iron windmill near western end of summit.

Reference mark: A Δ cut in sandstone ledge, with arrows cut on edge of bluff pointing to station.

Azimuth from Δ to center of windmill, 148° 23'; distance, 228 feet.



[Latitude 39° 43' 30.56". Longitude 82° 35' 42.36".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
B. I. S. chimney.....	16 17 55.39	196 16 42.49	3.9867933
B. I. S. water tower.....			3.9820877
Buck.....	302 38 44.12	122 42 18.23	3.9771162

GRAHAM, GALLIA COUNTY.

A flat, partly timbered ridge 9 miles by road, north-northwest of Gallipolis, 1½ miles east of Evergreen postoffice.

View eastward obstructed by timber, but in all other directions an extensive view can be had. Land owned by Charles Graham and rented by Mr. Sparrows.

Station mark: A marble post 30 by 6 by 6 inches, set 28 inches in the ground 7 feet east of signal tree and on south side of rail fence. In center of top is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The oak signal tree on fence line on south side of road, azimuth from mark, $99^{\circ} 11'$; distance, 7 feet.

[Latitude $38^{\circ} 54' 07.25''$. Longitude $82^{\circ} 15' 07.55''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° "	Meters.
Houck.....	15 43 53.36	195 40 54.83	4.4049004
Wagner.....	57 07 05.39	236 58 47.15	4.3584636
Davis.....	114 12 13.18	294 03 37.74	4.3352839
Leonard.....	186 38 36.75	6 39 15.03	4.1024633
Finlay.....	285 15 10.50	105 26 39.74	4.4386594

HOUCK, GALLIA COUNTY.

In Harrison township, on a bare hill owned by Noah Houck, 3 miles south of Lincoln and one-fourth mile north of Ruby postoffice. A few locust trees still standing near summit of hill.

Station mark: A sandstone post 30 by 8 by 8 inches set 28 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The locust signal tree, true azimuth from mark, $268^{\circ} 05'$; distance, 21.2 feet.

[Latitude $38^{\circ} 40' 54.17''$. Longitude $82^{\circ} 19' 52.51''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wray.....	49 35 13.43	229 30 22.22	4.1709604
Wagner.....	134 25 23.87	314 20 05.14	4.2358550
Graham.....	195 40 54.83	15 43 53.36	4.4049004
Finlay.....	242 38 56.49	62 53 22.49	4.5747505
Kennard.....	363 24 39.30	83 33 45.05	4.3270505
Gebhardt.....	338 02 32.74	158 05 28.36	4.2608573

WAGNER, GALLIA COUNTY.

A bald hill in Greenfield township, $1\frac{1}{2}$ miles northwest of Cadmus postoffice; one-half mile south of the Gallia-Portsmouth pike, at a point 17 miles west of the former, on land owned by Jacob Wagner. A tunch of small locusts on southwest side of hill interferes with view in that direction; in all other directions an extended view can be had.

Station mark: A sandstone post 30 by 15 by 15 inches, set 28 inches in the ground; top dressed 9 by 9 inches, having cemented in its center a bronze triangulation tablet, "Ohio."

[Latitude $38^{\circ} 47' 24.58''$. Longitude $82^{\circ} 28' 21.88''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Davis.....	178 19 50.05	358 19 33.89	4.3278387
Leonard.....	219 25 58.48	39 34 55.56	4.5104457
Graham.....	236 58 47.15	57 07 05.39	4.3584636
Houck.....	314 20 05.14	134 25 23.87	4.2358550
Wray.....	357 15 02.72	177 15 29.58	4.3360952

CLAYSVILLE, GUERNSEY COUNTY.

On a bald knob one-fourth mile northwest from village of Claysville.

Station mark: A bottle of ashes $2\frac{1}{2}$ feet below surface, above which is a tile 30 by 4 by 4 inches set 30 inches in the ground.

[Latitude $39^{\circ} 56' 25.33''$. Longitude $81^{\circ} 40' 43.04''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sago.....	131 54 42.28	311 50 42.87	4.0746717
College.....	193 42 02.84	13 43 15.84	4.0557460
Midway.....	226 49 26.89	46 55 37.28	4.2725062
Warehime.....	264 12 48.08	84 24 23.41	4.4121452
Gregg.....	290 24 08.88	110 31 13.35	4.2245402

COLLEGE, GUERNSEY COUNTY.

In a field about 400 feet southeast from white schoolhouse, on what is known locally as College Hill, 2.5 miles northwest of Cambridge.

Station mark: A limestone post 40 by 7 by 7 inches set 39 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 02' 23.47". Longitude 81° 38' 49.47".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Claysville.....	13 43 15.84	193 42 02.84	4.0557460
Sago.....	74 54 42.29	254 49 29.58	4.0771353
Kennedy.....	152 47 17.23	332 45 02.42	4.0350419
Midway.....	260 51 24.41	80 56 22.09	4.0455896

KENNEDY, GUERNSEY COUNTY.

On east slope of hill, in field owned by Mr. Kennedy, about 5 miles west of Kimbolton and 3 miles northwest of Hopewell village.

Station mark: A sandstone post 40 by 7 by 7 inches set 36 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 07' 36.01". Longitude 81° 42' 18.85".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sago.....	27 14 31.91	207 11 33.69	4.1566993
Widder.....	212 17 49.89	32 21 19.42	4.1574000
Booth.....	230 51 07.97	50 57 10.87	4.2342578
Midway.....	296 16 48.49	116 24 01.27	4.2495411
College.....	332 45 02.42	152 47 17.23	4.0350419

MIDWAY, GUERNSEY COUNTY.

About 6 miles northeast of Cambridge and 1½ miles southeast of village of Midway, 200 feet west of north and south road and 300 feet northwest of schoolhouse, on a prominent bald hill.

Station mark: A limestone post 36 by 6 by 6 inches set 30 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 03' 20.47". Longitude 81° 31' 06.84'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Claysville.....	46 55 37.28	226 49 26.89	4.2725062
College.....	80 56 22.09	260 51 24.41	4.0455896
Kennedy.....	116 24 01.27	296 16 48.49	4.2495411
Widder.....	157 42 44.98	337 39 01.10	4.3353514
Booth.....	172 07 03.12	352 05 52.54	4.2759110
Warehime.....	310 23 54.26	130 29 19.95	4.1983205
Gregg.....	353 48 09.85	173 49 04.63	4.2735701

HALL'S KNOB, GUERNSEY COUNTY.

(Not occupied.)

A high knob in northern part of Millwood township, locally known as Joe Hall's knob.

Station mark: Center of tobacco barn on highest part of knob.

[Latitude 39° 59' 57.14". Longitude 81° 17' 15.25'.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sewellsville.....	209 31 02.83	29 33 48.43	4.0925218
Steele.....	290 41 37.89	110 43 48.80	3.7132089

M'BRIDE, GUERNSEY COUNTY.

Situated on a cleared hill about 2 miles northeast of the village of Antrim, in Londonderry township. Land owned by J. E. McBride.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

PRELIMINARY REPORT ON THE

[Latitude 40° 07' 59.22". Longitude 81° 20' 04.72".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Warehime.....	11 05 17.55	191 03 37.47	4.2832082
Tippecanoe.....	203 13 59.21	23 16 45.07	4.1873542
Prospect Hill.....	226 01 54.41	46 06 58.83	4.1902726
Sewellsville.....	292 03 17.71	112 07 52.73	4.0377941
Steele.....	332 03 18.01	152 07 18.16	4.2763262

WAREHIME, GUERNSEY COUNTY.

Situated on a high cleared hill in Richland township, about $2\frac{1}{2}$ miles southeast of Gibson station. Land owned by Albert Warehime.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 57' 48.36". Longitude 81° 22' 40.22".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tucker.....	5 11 30.20	185 11 04.50	4.0219463
Pleasant.....	17 43 25.93	197 40 49.35	4.2799538
Gregg.....	49 56 24.57	229 51 54.19	4.1165523
McBride.....	191 03 37.47	11 05 17.55	4.2832082
Sewellsville.....	223 05 20.85	43 11 35.43	4.3052324
Steele.....	260 15 48.06	80 21 27.72	4.1047692
Wiedman.....	301 06 46.06	130 14 07.62	4.3304252
Calland.....	345 08 11.50	165 10 18.15	4.2628296

CADIZ, HARRISON COUNTY.

Situated $1\frac{1}{8}$ miles north of the town of Cadiz on a hill locally known as the sand lot, on land owned by Louis Rider, at forks of road to Hanover and Rumley.

Theodolite elevated 52 feet.

Station mark: A cut marble post 48 by 6 by 6 inches sunk 36 inches in the ground, in center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $40^{\circ} 17' 22.36''$. Longitude $81^{\circ} 00' 14.58''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Jefferson.....	196 06 28.74	16 08 19.68	4.1631951
Hopedale.....	249 40 19.70	69 46 06.04	4.1295800
Mount Pleasant.....	312 57 37.85	133 05 59.66	4.4004381
Clarks Hill.....	350 11 27.43	170 13 03.92	4.3177623
Sewellsville.....	40 08 03.66	219 59 50.71	4.4482271
Deersville.....	97 22 22.94	277 15 19.98	4.1923301
Bowerston.....	124 38 35.25	304 31 25.13	4.2799048

CADIZ COURT-HOUSE, HARRISON COUNTY.

(Not occupied.)

Station mark: Center of cupola on court-house.

[Latitude $40^{\circ} 16' 22.39''$. Longitude $80^{\circ} 59' 52.62''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Hopedale.....	241 40 48.88	61 46 20.94	4.1388232
Mount Pleasant.....	310 31 40.34	130 39 47.88	4.3715307

JEFFERSON, HARRISON COUNTY.

Situated on a bare hill one-fourth mile northwest of the town of Jefferson, between the forks of the New Philadelphia and Carrollton roads, on land owned by Samuel Meed.

Station mark: A cut marble post 42 by 6 by 6 inches sunk 36 inches in the ground, in center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $40^{\circ} 24' 55.88''$. Longitude $80^{\circ} 57' 23.13''$]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cadiz.....	16 08 19.68	196 06 28.74	4.1631951
Carrollton	160 48 24.64	340 45 32.78	4.2772402
Elders.....	206 09 16.01	26 13 45.61	4.3452306
Wintersville.....	274 33 35.99	94 42 21.10	4.2824762
Hopedale.....	317 18 11.04	137 22 06.82	4.1028039
Deersville.....	58 24 40.31	238 15 45.68	4.3594835
Bowerston.....	80 54 37.31	260 45 35.42	4.3003187

BOWERSTON, HARRISON COUNTY.

Situated on a cleared hill in section 25, Monroe township, about 2 miles south of the village of Bowerston, on land owned by J. E. Brown.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $40^{\circ} 23' 13.23''$. Longitude $81^{\circ} 11' 18.71''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tippecanoe.....	24 21 54.23	204 19 00.04	4.1880466
Jefferson.....	260 45 35.42	80 54 37.31	4.3003187
Cadiz.....	304 31 25.13	124 38 35.25	4.2799048
Deersville.....	358 23 14.06	178 23 20.87	3.9461666

DEERSVILLE, HARRISON COUNTY.

Situated in the village of Deersville, Franklin township. Station is the spire or center of cupola of public school building in the eastern part of the village.

Station mark: Center of cupola.

[Latitude 40° 18' 26.93". Longitude 81° 11' 08.13".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sewellsville.....	6 19 40.88	186 18 29.97	4.3730446
Prospect.....	10 06 05.78	190 05 23.84	3.9417489
Tippecanoe.....	51 43 47.10	231 40 46.25	3.9252612
Bowerston.....	178 23 20.87	358 23 14.06	3.9461666
Jefferson	238 15 45.68	58 24 40.31	4.3594835
Cadiz.....	277 15 19.98	97 22 22.94	4.1923301

PROSPECT HILL, HARRISON COUNTY.

Situated on the summit of a sharp hill, about 4 miles northeast of Freeport and just east of the Freeport and Cadiz road. The hill is known locally as Prospect Hill and is the highest point for miles around. Land owned by Robert Moore.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 13' 47.80". Longitude 81° 12' 12.96".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Sewellsville.....	4 06 05.81	184 05 36.80	4.1729676
McBride.....	46 06 58.83	226 01 54.41	4.1902726
Tippecanoe.....	123 45 44.31	303 43 25.52	3.7857938
Deersville.....	190 05 23.84	10 06 05.78	3.9417489
Flushing.....	306 47 57.00	126 53 22.00	4.1720159

RUMLEY, HARRISON COUNTY.

(Not occupied.)

Station mark: Spire of Methodist Episcopal Church.

[Latitude 40° 24' 14.72". Longitude 81° 02' 04.54".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Jefferson.....	259 02 14.82	79 05 17.47	3.8303382
Cadiz.....	348 24 50.50	168 26 01.90	4.1130606

TIPPECANOE, HARRISON COUNTY.

Situated on the summit of a high, cleared hill in Washington township, about 2 miles southeast of the village of Tippecanoe. Land owned by William Welch.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 15' 37.77". Longitude 81° 15' 47.79".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McBride.....	23 16 45.07	203 13 59.21	4.1873542
Bowerston.....	204 19 00.04	24 21 54.23	4.1880466
Deersville.....	231 40 46.25	51 43 47.10	3.9252612
Prospect.....	303 43 25.52	123 45 44.31	3.7857938
Sewellsville.....	347 33 48.12	167 35 37.71	4.2714644

BARTON, HOCKING COUNTY.

On a flat cultivated ridge, in section 18, Washington township, owned by William Barton, who lives one-fourth mile west of station. Selected and occupied by the United States Coast and Geodetic Survey in 1884-85.

Station mark: A marble post 30 by 6 by 6 inches set 28 inches in the ground over an earthenware pyramid. Top of post marked,

U.	S.
C. &	G. S.

Reference marks: Three marble posts 30 by 4 by 4 inches, set as follows:

- (1) True azimuth, $99^{\circ} 53'$; distance, 140.25 feet.
 (2) True azimuth, $54^{\circ} 41'$; distance 175.8 feet.
 (3) True azimuth, $338^{\circ} 12'$; distance 437.75 feet.

[Latitude $39^{\circ} 26' 22.32''$. Longitude $82^{\circ} 29' 46.50''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Brown.....	146 40 36.24	326 36 32.15	4.2220318
Schultz.....	222 46 20.65	42 49 24.02	4.0063768
Cook.....	228 57 23.90	49 03 10.28	4.2366543
Brooks.....	257 42 22.62	77 52 27.11	4.3666779
McDaniel.....	290 56 26.59	111 03 09.10	4.2107237
Zaleski.....	338 05 36.66	158 09 14.12	4.3433070

BOYS' INDUSTRIAL SCHOOL CHIMNEY, HOCKING COUNTY.

(Not occupied.)

In sections 35 and 36, Hocking township, 6 miles south of Lancaster.
 Station mark: Center of tall brick chimney.

[Latitude $39^{\circ} 38' 28.64''$. Longitude $82^{\circ} 37' 36.53''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pleasant (2).....	196 16 42.49	16 17 55.39	3.9867933
Buck.....	248 35 57.26	68 40 43.74	4.0607701
Schultz.....	309 29 26.62	129 37 29.82	4.3707116
Brown.....	346 20 02.87	166 20 57.88	3.9405008

BOYS' INDUSTRIAL SCHOOL WATER TOWER, HOCKING COUNTY.

(Not occupied.)

In sections 35 and 36, Hocking township, 6 miles south of Lancaster.
 Station mark: Center of large white water tower.

PRELIMINARY REPORT ON THE

[Latitude 39° 38' 32.48". Longitude 82° 37' 38.20".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pleasant (2).....	.....	.....	3.9820877
Buck.....	.....	.....	4.0605764
Schultz.....	309 39 00.95	129 47 05.22	4.3726735
Brown.....	346 15 44.39	166 16 40.48	3.9466564

BROOKS, HOCKING COUNTY.

A station of the United States Coast and Geodetic Survey, on a wooded ridge near the northern line of section 19, Ward township, about 3 miles north of Nelsonville.

Station mark: Amarble post 29 by 6 by 6 inches, set 22 inches in the ground, above a square earthenware pyramid 5 inches high. Top

of post marked

U.	S.
C. &	G. S.

Reference marks: (1) A marble post 30 by 4 by 4 inches set 28 inches in the ground; azimuth from mark, 74° 11'; distance, 110.75 feet. (2) A marble post 30 by 4 by 4 inches, set 28 inches in the ground; azimuth from mark, 336° 13'; distance, 275 feet. (3) A marble post 30 by 4 by 4 inches, set 28 inches in the ground; azimuth from mark, 200° 35'; distance, 185.4 feet.

[Latitude 39° 29' 01.86". Longitude 82° 13' 55.39".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
McDaniel.....	35 15 15.27	215 11 53.84	4.1188828
Barton.....	77 52 27.11	257 42 22.62	4.3666779
Schultz.....	99 07 21.22	279 00 19.77	4.2050498
Cook.....	123 23 44.62	303 19 26.03	4.0653816
Nebo.....	303 54 52.42	124 00 23.75	4.1770814

BROWN, HOCKING COUNTY.

On the property of Isaac Brown, in the southeast quarter of section 30, Good Hope township, 13 miles by road west of Logan, 13 miles south of Lancaster, 5 miles west of Rockbridge. Station is just east

of a cemetery which occupies summit of hill and has a good view in nearly all directions.

Station mark: A marble post 30 by 6 by 6 inches, set 28 inches in the ground, over an earthenware pyramid.

[Latitude $39^{\circ} 33' 53.90''$. Longitude $82^{\circ} 36' 10.23''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
B. I. S. water tower.....	166 16 40.48	346 15 44.39	3.9466564
B. I. S. chimney.....	166 20 57.88	346 20 02.87	3.9405008
Buck.....	214 20 02.08	34 23 53.61	4.1858328
Cook.....	276 38 41.55	96 48 32.74	4.3486753
Schultz.....	291 55 33.81	112 02 41.69	4.2383235
Barton.....	326 36 32.15	146 40 36.24	4.2220318

COOK, HOCKING COUNTY.

On the estate of John Cook, in the northeast quarter of section 23, Green township, 4 miles east of Logan. A good view can be had in all directions excepting north 0° east to north 30° each, which is interfered with by timber at north end of ridge. This station was also occupied by the United States Coast and Geodetic Survey in 1881.

Station mark: A marble post 30 by 6 by 6 inches, set 28 inches in the ground, immediately above an earthenware pyramid. Top of post

marked

U.	S.
C. &	G. S.

[Latitude $39^{\circ} 32' 29.14''$. Longitude $82^{\circ} 20' 41.83''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Barton.....	49 03 10.28	228 57 23.90	4.2366543
Schultz.....	57 44 19.75	237 41 36.70	3.8596674
Brown.....	96 48 32.74	276 38 41.55	4.3486753
Buck.....	138 36 43.24	318 30 42.80	4.3091667
Brooks.....	303 19 26.03	123 23 44.62	4.0653816
McDaniel.....	352 53 21.32	172 54 18.10	4.2371864

M'DANIEL, HOCKING COUNTY.

Situated in the southern edge of the southwest quarter, section 7, Starr township, on the estate of George McDaniel, 8 miles southwest of Nelsonville postoffice, 15 miles southeast of Logan, and 2 miles east of Starr. The knob is quite prominent and has only a few trees on its southwest side to interfere with view. Selected and occupied by the United States Coast and Geodetic Survey in 1882-83.

Station mark: A marble post 26 by 6 by 6 inches, set 25 inches in the ground immediately above a square earthenware pyramid. Top of post

marked

U.	S.
C. &	G. S.

[Latitude 39° 23' 13.57". Longitude 82° 19' 12.52".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Zaleski.....	25 29 15.51	205 26 11.15	4.2098137
Barton.....	111 03 09.10	290 56 26.59	4.2107237
Schultz.....	148 07 04.09	328 03 24.55	4.1939372
Cook.....	172 54 18.10	352 53 21.32	4.2371864
Brooks.....	215 11 53.84	35 15 15.27	4.1188828
Nebo.....	263 16 04.46	83 24 56.70	4.3054151
White.....	274 32 58.10	94 42 43.35	4.3453947
Townsend (2).....	298 48 45.11	118 57 19.04	4.3458525

SCHULTZ, HOCKING COUNTY.

A prominent knob 3 miles south of Logan, on the estate of Daniel Schultz, in the west half of the northeast quarter of section 26, Falls township. Summit has apple and peach trees which interfere somewhat with the view. This station was occupied by the United States Coast and Geodetic Survey in 1885.

Station mark: A marble post 30 by 6 by 6 inches, set 28 inches in the ground immediately above an earthenware pyramid. Top of post

marked

U.	S.
C. &	G. S.

[Latitude 39° 30' 23.76". Longitude 82° 24' 58.05".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Barton.....	42 49 24.02	222 46 20.65	4.0063768
Brown.....	112 02 41.69	291 55 33.81	4.2383235
B. I. S. chimney.....	129 37 29.82	309 29 26.62	4.3707116
B. I. S. water tower.....	129 47 05.22	309 39 00.95	4.3726735
Buck.....	158 57 18.49	338 54 01.46	4.3120770
Cook.....	237 41 36.70	57 44 19.75	3.8596674
Brooks.....	279 00 19.77	99 07 21.22	4.2050498
McDaniel.....	328 03 24.55	148 07 04.09	4.1939372

DAVIS, JACKSON COUNTY.

On a cultivated hill in Bloomfield township, 12 miles eastward from Jackson, 1½ miles north of Orpheus postoffice, 3 miles east of Winchester (Rocky Hill postoffice). Land owned by Evan D. Davis, who lives about 500 feet west, southwest of station. An unobstructed view can be had for many miles toward the north, northwest and west, and comparatively few trees obstruct view southwest.

Station mark: Center of wild cherry signal tree about 500 feet east-northeast of Mr. Davis's residence and 13 feet south of an east and west fence.

[Latitude 38° 58' 54.17". Longitude 82° 28' 47.63".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Lawler.....	200 26 28.47	20 28 23.27	4.0984524
Graham.....	294 03 37.74	114 12 13.18	4.3352839
Wagner.....	358 19 33.89	178 19 50.05	4.3278387

ELDERS, JEFFERSON COUNTY.

Situated one-half mile south of the village of Monroeville on land owned by Mr. Elder.

Station mark: A cut marble post 48 by 6 by 6 inches set 40 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 35' 40.04". Longitude 80° 50' 28.10".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Jefferson.....	26 13 45.61	206 09 16.01	4.3452306
Carrollton.....	82 57 51.91	262 50 29.70	4.2070630
Kensington.....	148 30 40.69	328 26 39.02	4.2218375
Hammond.....	238 50 48.93	58 57 24.93	4.2224370
Allison.....	269 43 49.10	89 54 31.77	4.3659427
Wintersville.....	336 29 21.40	156 33 37.87	4.3683786

HOPEDALE, JEFFERSON COUNTY.

Situated 2 miles west of Bloomingdale on the north side of the Bloomingdale and Hopedale pike, on the highest point of hill in cleared field belonging to Mr. S. N. Beall.

Station mark: A cut marble post 24 by 4 by 4 inches sunk 24 inches in the ground. "U. S. G. S." marked on top of post.

[Latitude 40° 19' 53.80". Longitude 80° 51' 19.20".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Cadiz C. H.....	61 46 20.94	241 40 48.88	4.1388232
Cadiz	69 46 06.04	249 40 19.70	4.1295800
Jefferson.....	137 22 06.82	317 18 11.04	4.1028039
Wintersville.....	233 31 31.07	53 36 19.99	4.1166735
New Alexander.....	290 17 09.61	110 23 39.92	4.1817202
Mount Pleasant.....	345 17 50.68	165 20 26.93	4.3534510

NEW ALEXANDER, JEFFERSON COUNTY.

Situated 1 mile southwest of the village of New Alexander in a cleared field on west side of county road one-fourth mile beyond point at which it leaves the New Alexander and Bloomingdale pike.

Station mark: A cut marble post 24 by 6 by 6 inches sunk 2 feet under surface of the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference marks: A large tree, true bearing N. $53^{\circ} 20'$ E., distant 272 feet. A small tree, true bearing S. $1^{\circ} 36'$ W., distant 131 feet. An old stump in field, true bearing N. $68^{\circ} 36'$ W., distant 14.7 feet.

[Latitude $40^{\circ} 17' 02.55''$. Longitude $80^{\circ} 41' 15.83''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' ''	° ' ''	Meters.
Mount Pleasant.....	27 21 07.51	207 17 14.17	4.2700856
Hopedale.....	110 23 39.92	290 17 09.61	4.1817202
Wintersville.....	164 08 12.73	344 06 30.92	4.1325490
Independence.....	286 01 22.01	106 07 03.27	4.1133566
West Liberty.....	327 04 20.90	147 07 42.89	4.1338982

WINTERSVILLE, JEFFERSON COUNTY.

Situated 2 miles northwest of the village of Wintersville on a cone-shaped hill on land owned by Mr. Mayo. The Wintersville and New Richmond pike passes over east side of hill.

Station mark: A cut marble post 40 by 6 by 6 inches sunk 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $40^{\circ} 24' 05.70''$. Longitude $80^{\circ} 43' 53.11''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' ''	° ' ''	Meters.
Hopedale.....	53 36 19.99	233 31 31.07	4.1166735
Jefferson.....	94 42 21.10	274 33 35.99	4.2824762
Elder.....	156 33 37.87	336 29 21.35	4.3682786
Hammond.....	189 27 36.41	9 29 54.97	4.4836287
New Alexander.....	344 06 30.92	164 08 12.73	4.1325490

WRAY, LAWRENCE COUNTY.

A station in the transcontinental belt of the United States Coast

and Geodetic Survey on Johnson Ridge, $2\frac{1}{2}$ miles east of Marion (Aid postoffice). Summit nearly cleared, giving a good view in all directions.

Station mark: A pottery pyramid buried 3 feet under ground (no surface mark 1902).

Reference marks: Drain tile pipes 4 inches in diameter, 2 feet long, filled with concrete and buried 22 inches in ground—one north, 5.93 feet distant; one south, 5.99 feet; one east, 5.98 feet; one west, 5.92 feet.

[Latitude $38^{\circ} 35' 42.24''$. Longitude $82^{\circ} 27' 38.91''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wagner.....	177 15 29.58	357 15 02.72	4.3360952
Houck.....	229 30 22.22	49 35 13.43	4.1709604
Gebhardt.....	291 52 47.45	112 00 33.64	4.2904979

GREENLER, MEIGS COUNTY.

On a cultivated ridge in Scipio township, $2\frac{1}{2}$ miles southeast of Harrisonville and 9 miles northwest of Pomeroy. Land owned by the widow Greenler. An extended view can be had in all directions.

Station mark: A stone post 30 by 8 by 8 inches set 28 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 06' 36.10''$. Longitude $82^{\circ} 05' 37.56''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Leonard.....	49 22 32.39	229 17 11.56	4.2078401
McKnight.....	131 06 34.33	311 03 11.43	4.0103602
Townsend (2).....	179 42 39.02	359 42 36.35	4.3021055
Bond.....			4.4013817
Melhorn.....	279 28 14.79	99 41 07.07	4.4750063
Finlay.....	337 13 28.07	157 19 00.37	4.5174129

LEONARD, MEIGS COUNTY.

On a partly timbered ridge in Salem township, 12 miles by road west of Middleport, 4 miles north of Eno postoffice. Timber interferes

with view northeast and southeast, but in other directions the view is particularly good. Land owned by W. H. Leonard, who lives 300 yards north.

Station mark: A sandstone post 36 by 8 by 8 inches set 34 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The poplar signal tree at roadside. True azimuth from station mark, $322^{\circ} 19'$; distance, 128.1 feet.

[Latitude $39^{\circ} 00' 55.06''$. Longitude $82^{\circ} 14' 06.67''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Graham.....	6 39 15.03	186 38 36.75	4.1024633
Wagner.....	39 34 55.56	219 25 58.48	4.5104457
Lawler.....	115 35 43.20	295 28 23.01	4.2699658
Zaleski.....	151 46 12.85	331 39 56.21	4.4807510
McKnight.....	194 38 18.41	14 40 16.75	4.2510681
Greenler.....	229 17 11.56	49 22 32.39	4.2078401
Finlay.....	308 21 37.63	128 32 29.47	4.5039347

M'KNIGHT, MEIGS COUNTY.

A cleared ridge in the northwestern part of Scipio township, 2 miles east of Carpenter postoffice and 5 miles south of Albany. Land owned by Thornton McKnight.

Station mark: A bluestone post 40 by 8 by 8 inches set 38 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 10' 14.34''$. Longitude $82^{\circ} 10' 59.00''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Leonard.....	14 40 16.75	194 38 18.41	4.2510681
Zaleski.....	116 35 39.29	296 27 23.36	4.3229316
Townsend (2).....	209 42 32.43	29 45 53.05	4.1858081
Greenler.....	311 03 11.43	131 06 34.33	4.0103602

BEALLSVILLE, MONROE COUNTY.

Situated 3 miles east of the town of Beallsville on the highest point of a bare hill on the farm of the Gale brothers.

Station mark: A cut marble post 48 by 6 by 6 inches set 40 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 50' 49.76''$. Longitude $80^{\circ} 58' 49.99''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Gallaway.....	182 29 34.33	2 29 55.83	4.2612655
Jacobsburg	210 24 53.13	30 28 36.52	4.2108474
Myers.....	221 32 26.97	41 39 03.80	4.3447990
Riggs.....	269 45 19.11	89 53 56.89	4.2835700
Wiedman.....	87 09 57.20	267 02 01.79	4.2471021
Newcastle.....	118 21 49.78	298 18 11.29	3.9639688
Steele.....	125 11 13.00	305 01 44.45	4.4179181
Bryan.....	155 16 01.67	335 13 05.87	4.1914760

CALLAND, MONROE COUNTY.

Situated on a high cleared hill in Seneca township, about 2 miles northeast of village of Summerfield, near the Noble-Monroe county line. Land owned by Mrs. Martha Calland.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 48' 14.31''$. Longitude $81^{\circ} 19' 22.61''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Fulda.....	53 35 25.20	233 32 02.90	3.9709420
Pleasant.....	87 36 24.91	267 31 42.37	4.0215172
Tucker.. ..	142 01 12.68	321 58 40.51	3.9625705
Warehime.....	165 10 18.15	345 08 11.50	4.2628296
Steele.....	201 35 53.45	21 39 25.88	4.3293954
Wiedman.	251 29 17.30	71 34 31.64	4.0901708

JERUSALEM SCHOOLHOUSE, MONROE COUNTY.

(Not occupied.)

Schoolhouse in Jerusalem, Sunbury township.

Station mark: Center of cupola.

[Latitude 39° 50' 54.00". Longitude 81° 06' 06.45".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wiedman.....	81 59 06.96	261 55 51.27	3.8653255
Newcastle.....	208 14 14.47	28 15 15.85	3.6820293

ST. JOHNS, MONROE COUNTY.

(Not occupied.)

St. John's Church, situated about one-half mile west of village of Miltonsburg.

Station mark: Center of church spire.

[Latitude 39° 50' 15.20". Longitude 81° 10' 32.48".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Steele.....	163 40 24.15	343 38 16.46	4.2252598
Newcastle.....	237 40 56.39	57 44 48.27	4.0073924
Wiedman.....	.....	.....	2.9781631

DILLON, MONROE COUNTY.

Station mark: The chimney on Mr. J. D. Dillon's residence, 1 mile south of Way postoffice.

[Latitude 39° 37' 40.67". Longitude 81° 10' 31.26".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Moore.....	19 50 50.56	199 47 41.01	4.3215874
Laws.....	65 40 13.26	245 36 29.65	3.9630466
Tank.....	216 55 13.70	36 57 28.00	3.9554300
High Knob.....	282 34 05.00	102 39 53.00	4.1253100
Glass.....	332 17 56.67	152 19 54.03	3.9758125

HIGH KNOB, MONROE COUNTY.

A high peak near Sisterville on Ohio side of Ohio river, having 2 red tanks on summit.

Station mark: Wooden projection on southeast side of eastern tank.

[Latitude $39^{\circ} 36' 05.63''$. Longitude $81^{\circ} 01' 26.40''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Glass.....	57 43 14	237 39 23	4.00930
Dillon.....	102 39 53	282 34 05	4.12531

TANK, MONROE COUNTY.

On the highest knob 6 miles south of Woodsfield and 5 miles northeast of Graysville. There are two tanks on top of the knob. The one located is the farthest west and is painted white.

Station mark: Center of tank.

[Latitude $39^{\circ} 41' 34.6''$. Longitude $81^{\circ} 06' 43.7''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Glass.....	3 48 12	183 47 44	4.19380
Dillon.....	36 57 28	216 55 14	3.95543
Laws.. ..	51 27 48	231 21 39	4.24646

WIEDMAN, MONROE COUNTY.

Situated on a cleared hill in Malaga township, about 2 miles southwest of village of Miltonsburg. Land owned by Mr. Wiedman.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 50' 20.74". Longitude 81° 11' 11.82".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Calland.....	71 34 31.64	251 29 17.30	4.0901708
Tucker.....	100 57 09.79	280 49 22.91	4.2463136
Warehime.....	130 14 07.62	310 06 46.06	4.3304252
Steele.....	166 38 26.80	346 36 44.38	4.2146469
Newcastle.....	241 04 21.24	61 08 38.37	4.0370559
Beal'sville.....	267 02 01.79	87 09 57.20	4.2471021

WOODSFIELD COURT-HOUSE, MONROE COUNTY.

(Not occupied.)

Station mark: Center of court-house cupola.

[Latitude 39° 45' 53.10". Longitude 81° 07' 04.01".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wiedman.....	144 29 15.26	324 26 36.62	4.0061831
Beallsville.....	232 04 06.58	52 09 22.97	4.1730814

SAGO, MUSKINGUM COUNTY.

On a bald hill 4 miles southwest of the village of Sago, on land owned by J. W. Carnes.

Station mark: A limestone post 40 by 7 by 7 inches set 39 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 00' 42.40". Longitude 81° 46' 55.70".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kennedy.....	207 11 33.69	27 14 31.91	4.1566993
College.....	254 49 29.58	74 54 42.29	4.0771353
Claysville.....	311 50 42.87	131 54 42.28	4.0746717

COFFEY, NOBLE COUNTY.

Situated in Jefferson township, about 2 miles east of Macksburg and near the Noble-Washington county line. It is on a knob at the southern end of what is locally known as Coffey Ridge. Land belongs to the Coffey Brothers. A house surrounded by a peach orchard occupies the whole summit of knob.

Station mark: A stone post 15 by 6 by 6 inches set 15 inches in the ground, with a cross cut on upper surface.

Reference mark: The south chimney of house; distance from station 69 feet; azimuth $121^{\circ} 43'$.

Subsurface mark: An aluminum bolt buried 2 feet below surface underneath station mark.

[Latitude $39^{\circ} 38' 20.51''$. Longitude $81^{\circ} 25' 56.23''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Dovenbacker.....	21 34 03.43	201 32 41.16	3.9232258
Correy.....	134 02 58.60	313 58 36.21	4.1340788
Fulda.....	188 13 57.47	8 14 46.99	4.1102507
Laws.....	290 04 00.35	110 10 06.45	4.1639102

CORREY, NOBLE COUNTY.

Situated in Olive township on summit of hill known locally as Correy Knob. Land belongs to John Hughes and is covered with a peach orchard.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 43' 27.31''$. Longitude $81^{\circ} 32' 47.22''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Gregg.....	193 41 15.25	13 43 14.30	4.2709766
Pleasant.....	225 47 16.75	45 51 09.15	4.0813436
Fulda.....	254 08 13.79	74 13 26.06	4.0823867
Coffey.....	313 58 36.21	134 02 58.60	4.1340788
Dovenbecker.....	338 41 35.73	158 44 36.15	4.2675872
Fulda Church.....	270 09 40.00	90 14 41.00	4.0496191

FULDA, NOBLE COUNTY.

Situated on a cleared hill in Enoch township about 2 miles north of Fulda postoffice. Land owned by Mr. Bates.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 45' 14.16". Longitude 81° 24' 38.75".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Coffey.....	8 14 46.99	188 13 57.47	4.1102507
Dovenbecker.....	13 29 38.34	193 27 26.49	4.3249454
Correy.....	74 13 26.06	254 08 13.79	4.0823867
Pleasant.....	149 46 36.80	329 45 16.75	3.7718484
Tucker.....	188 18 59.48	8 19 49.89	4.1112795
Calland.....	233 32 02.90	53 35 25.20	3.9709420
Laws.....	326 17 40.64	146 22 57.69	4.3294759

FULDA CHURCH SPIRE, NOBLE COUNTY.

(Not occupied.)

In village of Fulda.

Station mark: Center of church spire.

[Latitude 39° 43' 26.01". Longitude 81° 24' 56 52".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Correy.....	90 14 41.03	270 09 40.22	4.0496191
Fulda $\triangle$	187 13 47.17	7 13 58.53	3.5265941

GREGG, NOBLE COUNTY.

Situated on a cleared hill in Wayne township about 4 miles south of Senecaville and near the Noble-Seneca county line. Hill partly covered by an orchard. Land owned by Walter Gregg.

Station mark: A boulder 20 by 10 by 8 inches set in the ground, and having a cross (+) cut on its upper surface.

Subsurface mark: A bronze triangulation tablet buried 2 feet below surface immediately underneath cross on boulder.

[Latitude 39° 53' 15.23". Longitude 81° 29' 41.50".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Correy.....	13 43 14.30	193 41 15.25	4.2709766
Warehime.....	229 51 54.19	49 56 24.57	4.1165523
Tucker.....	282 43 32.96	102 47 37.40	3.9679631
Pleasant.....	336 31 55.44	156 33 49.16	4.0254160

PLEASANT, NOBLE COUNTY.

Situated on a high hill, with a few scattering trees on its summit, in Center township, about 2 miles southeast of Sarahsville.

Station mark: A stone post 30 by 6 by 6 inches set 30 inches in the ground, in center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 47' 59.84". Longitude 81° 26' 43.92".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Correy.....	45 51 09.15	225 47 16.75	4.0813436
Gregg.....	156 33 49.09	336 31 55.44	4.0254160
Warehime.....	197 40 49.35	17 43 25.93	4.2799538
Tucker.....	212 14 38.28	32 16 48.80	3.9579200
Calland.....	267 31 42.37	87 36 24.91	4.0215172
Fulda.....	329 45 16.75	149 46 36.80	3.7718484

SUMMERFIELD SCHOOLHOUSE, NOBLE COUNTY.

(Not occupied.)

Station mark: Center of schoolhouse in village of Summerfield.

[Latitude 39° 47' 55.47". Longitude 81° 20' 16.71".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Tucker.....	150 49 58.53	330 48 01.02	3.9516327
Calland.....	245 41 23.24	65 42 07.87	3.1498794

TUCKER, NOBLE COUNTY.

Situated on a partly cleared hill in Seneca township, about 3 miles northeast of Mount Ephraim postoffice. Land owned by John Tucker.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 52' 08.72". Longitude 81° 23' 20.21".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pleasant.....	32 16 48.80	212 14 38.28	3.9579200
Gregg.....	102 47 37.40	282 43 32.96	3.9679631
Warehime.....	185 11 04.50	5 11 30.20	4.0219463
Steele.....	226 53 52.54	46 59 57.57	4.2667725
Calland.....	321 58 40.51	142 01 12.68	3.9625705
Fulda.....	8 19 49.89	188 18 59.48	4.1112795

BALDWIN, TUSCARAWAS COUNTY.

About 7 miles northeast from Uhrichsville, on a bald hill 100 yards east of ridge road, on land owned by David Baldwin.

Station mark: A sandstone post 36 by 6 by 6 inches set 33 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 27' 01.37". Longitude 81° 17' 28".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Wainwright.....	75 00 27.85	254 54 15.71	4.1462651
Bowerston.....	308 57 08.21	129 01 07.70	4.0493365
Uhrichsville	355 40 02.51	175 40 20.53	3.9386187

BOOTH, TUSCARAWAS COUNTY.

On a sharp, bald knob, 5 miles southeast from New Comerstown, one-fourth mile south from Booth postoffice, and 400 feet southeast of Mr. Walter's residence, on land owned by him.

Station mark: A sandstone post 36 by 7 by 7 inches set 34 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 13' 26.69". Longitude 81° 32' 56.37".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Kennedy.....	50 57 10.87	230 51 07.97	4.2342578
Widder.....	103 17 39.33	283 15 05.76	3.7615799
Wasen.....	166 55 12.11	346 53 04.26	4.2784021
Stone Creek.....	179 22 08.98	359 22 03.72	4.2391088
Gilmore.....	228 11 04.90	48 15 13.50	4.0860014
Midway.....	352 05 52.54	172 07 03.12	4.2759110

GILMORE, TUSCARAWAS COUNTY.

On a bald knob one-third mile north of the village of Gilmore, 300 feet from where road elbows to east going from Gilmore.

Station mark: A sandstone post 36 by 6 by 6 inches set 33 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 17' 50.02". Longitude 81° 26' 31.76".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Widder.....	65 15 18.37	245 08 36.06	4.2095562
Port Washington.....	107 14 03.00	287 11 28.00	3.7758800
Stone Creek.....	134 52 35.59	314 48 21.35	4.1164240
Wainwright.....	176 58 27.78	356 58 08.37	4.1267768
Uhrichsville.....	238 12 02.93	58 18 12.91	4.2004975
Tippecanoe.....	284 58 09.52	105 05 05.88	4.1973700
Booth.....	48 15 13.50	228 11 04.90	4.0860014

PORT WASHINGTON, TUSCARAWAS COUNTY.

(Not occupied.)

A lone tree on prominent bald mound about 2 miles south of the village of Port Washington, on east side of river.

Station mark: Center of lone tree.

[Latitude 40° 18' 47.30". Longitude 81° 30' 33.18".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Widder.....	46 27 45	226 23 39	4.09426
Wasen.....	138 16 26	318 12 55	4.06184
Stone Creek.....	154 24 37	334 22 59	3.91720
Gilmore.....	287 11 28	107 14 03	3.77588

STONE CREEK, TUSCARAWAS COUNTY.

On a bald mound $1\frac{1}{4}$ miles southeast of the village of Stone Creek, 100 yards east of road.

Station mark: A sandstone post 36 by 6 by 6 inches set 34 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 22' 48.92". Longitude 81° 33' 04.48".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Widder.....	18 43 44.26	198 41 15.69	4.2281117
Wasen.	105 39 23.20	285 37 30.42	3.6297872
Wainwright.....	244 04 51.38	64 08 46.51	3.9781630
Gilmore.....	314 48 21.35	134 52 35.59	4.1164240
Port Washington.....	334 22 59.00	154 24 37.00	3.9172000
Booth.....	359 22 03.72	179 22 08.98	4.2391088

UHRICHSVILLE, TUSCARAWAS COUNTY.

On a bald hill about 4 miles nearly east from Uhrichsville, 200 feet west of Ridge road, on land owned by Mr. Cox, and 200 yards north of his residence.

Station mark: The lone white oak signal tree 14 inches in diameter.

Reference mark: A sandstone post 36 by 6 by 6 inches set 30 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio." Distance from tree, 26.6 feet; true azimuth $56^{\circ} 10' 30''$.

[Latitude $40^{\circ} 22' 20.70''$. Longitude $81^{\circ} 17' 00.20''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Gilmore.....	58 18 12.91	238 12 02.93	4.2004975
Wainwright.....	109 32 49.03	289 26 19.17	4.1775531
Baldwin.....	175 40 20.53	355 40 02.51	3.9386187
Bowerston.....	258 40 32.66	78 44 13.95	3.9146861
Tippecanoe.....	352 09 53.49	172 10 40.33	4.0986574

WAINWRIGHT, TUSCARAWAS COUNTY.

In a field owned by the Wainwright Coal Company, and about $1\frac{1}{2}$ miles west of the mine and postoffice of same name.

Station mark: A sandstone post 36 by 6 by 6 inches set 34 inches in the ground, in the center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude $40^{\circ} 25' 03.52''$. Longitude $81^{\circ} 27' 01.78''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Stone Creek	64 08 46.51	244 04 51.38	3.9781630
Wasen	76 42 24.37	256 36 36.39	4.1142974
Baldwin.....	254 54 15.71	75 00 27.85	4.1462651
Urichsville.....	289 26 19.17	109 32 49.03	4.1775531
Gilmore	356 58 08.37	176 58 27.78	4.1267768

WASEN, TUSCARAWAS COUNTY.

About $2\frac{1}{2}$ miles nearly west from the village of Stone Creek on high knob in field 400 feet southeast from Mr. Wasen's residence.

Station mark: A sandstone post 36 by 6 by 6 inches set 36 inches in the ground, in center of top of which is countersunk and cemented a bronze triangulation tablet, "Ohio."

[Latitude 40° 23' 26.19". Longitude 81° 35' 58.61".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Widder.....	4 22 43.79	184 22 07.82	4.2359074
Wainwright.....	256 36 36.39	76 42 24.37	4.1142974
Stone Creek.....	285 37 30.42	105 39 23.20	3.6297872
Port Washington.....	318 12 55.00	138 16 26.00	4.0618400
Booth.....	346 53 04.26	166 55 12.11	4.2784021

LAWLER, VINTON COUNTY, NEAR JACKSON COUNTY LINE.

A secondary station on a flat, partly timbered ridge 8 miles by road east-southeast of Wellston postoffice, land owned by Frank Lawler, but rented by Jim Kennison.

Station mark: South chimney on two-story house with red tin roof.

[Latitude 39° 05' 15.32". Longitude 82° 25' 45.35".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Davis.....	20 28 23.27	200 26 28.47	4.0984524
Leonard.....	295 28 23.01	115 35 43.20	4.2699658
Graham.....	323 15 25.71	143 22 07.04	4.4097687

ZALESKI, VINTON COUNTY.

A knob locally well known as the Pinnacle, 1½ miles south of Zaleski railroad station. Nearly all timber was cut down and one chestnut tree left for signal. An extended view can be had in all directions, excepting north 30° east to north 55° east, which is limited by a flat timbered ridge 2 miles distant.

Station mark: A marble post 30 by 6 by 6 inches set 20 inches in the ground, top marked,



Reference mark: The chestnut signal tree; azimuth from station mark, $237^{\circ} 08'$; distance, 32.8 feet.

[Latitude $30^{\circ} 15' 18.96''$. Longitude $82^{\circ} 24' 03.47''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Barton.....	158 09 14.12	338 05 36.66	4.3433070
McDaniel.....	205 26 11.15	25 29 15.51	4.2098137
Townsend (2).....	261 26 53.85	81 38 31.23	4.4264864
McKnight.....	296 27 23.36	116 35 39.29	4.3229316
Leonard.....	331 39 56.21	151 46 12.85	4.4807510

DOVENBECKER, WASHINGTON COUNTY.

Situated about 5 miles southwest of Macksburg in pasture field on a high, cleared hill. Land owned by William Dovenbecker.

Station mark: A sandstone post 48 by 6 by 6 inches set 48 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 34' 07.79''$. Longitude $81^{\circ} 28' 05.23''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Correy.....	158 44 36.15	338 41 35.73	4.2675872
Fulda.....	193 27 26.49	13 29 38.34	4.3249454
Coffey.....	201 32 41.16	21 34 03.43	3.9232258
Laws.....	260 32 30.54	80 39 58.60	4.2307093
Moore.....	306 00 36.00	126 08 37.09	4.3492957

LAWS, WASHINGTON COUNTY.

Situated on a high, cleared, flat-topped hill in Liberty township, about three-quarters of a mile south of the village of Lebanon. Land owned by Mr. Laws.

Station mark: A dead oak tree.

Reference mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze trian-

gulation tablet, "Ohio." Distance to center of tree, 1.4 feet; true azimuth, $170^{\circ} 43'$.

[Latitude $39^{\circ} 35' 37.83''$. Longitude $81^{\circ} 16' 21.98''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pinkerton.....	50 51 42.70	230 41 51.34	4.4572810
Dovenbecker.....	80 39 58.60	260 32 30.54	4.2307093
Coffey.....	110 10 06.45	290 04 00.35	4.1639102
Fulda.....	146 22 57.69	326 17 40.64	4.3294759
Moore.....	355 27 25.12	175 27 58.83	4.2038199

GLASS, WASHINGTON COUNTY.

On north end of ridge, 0.5 mile east of Glass postoffice and 100 feet south of road.

Station mark: A sandstone post 36 by 8 by 8 inches set 36 inches in the ground, with cross cut in center of top.

Reference mark: Chimney on a small frame house owned by John Newel, 14 feet south of station mark.

[Latitude $39^{\circ} 33' 09.09''$. Longitude $81^{\circ} 07' 27.10''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Moore.....	45 26 59.54	225 21 53.00	4.2086840
Laws.....	109 48 40.00	289 42 59.25	4.1324413
Dillon.....	152 19 54.03	332 17 56.67	3.9758125
Tank.....	183 47 44.00	3 48 12.00	4.1938000
High Knob.....	237 39 23.00	57 43 14.00	4.0093000

MOORE, WASHINGTON COUNTY.

Situated 4 miles north of Newport, Ohio, on a high cleared knob owned by Mr. Moore and known locally as Moore's Hill.

Station mark: A sandstone post 48 by 8 by 8 inches set 48 inches in the ground, and in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude 39° 27' 00.99". Longitude 81° 15' 29.00".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Pinnacle.....	24 47 56.51	204 43 50.23	4.3462483
Seffens.....	64 45 45.97	244 33 51.52	4.4743073
Pinkerton.....	84 46 38.67	264 36 14.56	4.3728093
Dovenbecker.....	126 08 37.09	306 00 36.00	4.3492957
Laws.....	175 27 58.83	355 27 25.12	4.2038199
Owlshead.....	272 39 24.48	92 50 53.05	4.4140545
McCullough.....	308 27 51.47	128 34 48.44	4.3030833
Griffith.....	354 57 28.03	174 57 55.01	4.0637096

NOLAN, WASHINGTON COUNTY.

Situated in Dunham township, about 2 miles west of Veto postoffice and 4 miles southwest of Vincent railroad station. Summit of hill occupied by house surrounded by shade and fruit trees. Land owned by R. E. Sutton.

Station mark: A stone post 40 by 6 by 6 inches set 36 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: Chimney on north end of house; distance from station mark, 34 feet; true azimuth from station mark, 142° 29' 20".

[Latitude 39° 20' 38.11". Longitude 81° 42' 39.55".]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Lyons.....	36 33 16.71	216 30 09.55	4.0753794
Bond.....	46 14 13.62	226 08 49.91	4.2298152
Southland.....	109 14 36.48	289 09 05.68	4.1212888
Goff.....	314 58 46.74	135 04 44.31	4.2822068
Wigal.....	350 54 54.61	170 56 08.43	4.2486674

PINKERTON, WASHINGTON COUNTY.

Situated about 4 miles northwest of Marietta and 2 miles south of Churchtown on Pinkerton farm, 600 feet west of Pinkerton residence.

Station mark:: A sandstone post 48 by 8 by 8 inches set 48 inches in the ground, and in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

[Latitude $39^{\circ} 25' 50.23''$. Longitude $81^{\circ} 31' 51.42''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Goff.....	4 55 52.16	184 54 59.34	4.3666186
Seffens.....	17 59 25.94	197 57 54.99	4.0458915
Nolan.....	58 13 59.25	238 07 08.00	4.0836942
Dovenbecker.....	199 23 14.85	19 25 38.76	4.2113735
Laws.....	230 41 51.34	50 51 42.70	4.4572810
Moore.....	264 36 14.56	84 46 38.67	4.3728093
Griffith.....	290 46 50.36	110 57 40.75	4.4191325
Pinnacle.....	321 34 57.99	141 41 14.67	4.3601976

SEFFENS, WASHINGTON COUNTY.

Situated on the summit of a cleared hill in Dunham township about 1 mile west of Constitution railroad station. Land owned by William Seffens.

Station mark: A stone post 30 by 8 by 8 inches set 30 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet, "Ohio."

Reference mark: The southern one of three trees which occupy the extreme summit of hill; distance from station mark, 3.1 feet; true azimuth from station mark, $46^{\circ} 22'$.

[Latitude $39^{\circ} 20' 07.43''$ Longitude $81^{\circ} 34' 14.77''$.]

To station—	Azimuth.	Back azimuth.	Log. distance.
	° ' "	° ' "	Meters.
Nolan.....	94 31 08.23	274 25 48.26	4.0836942
Pinkerton.....	197 57 54.99	17 59 25.94	4.0458915
Moore.....	244 33 51.52	64 45 45.97	4.4743073
Pinnacle.....	292 39 17.80	112 47 04.89	4.2822967
Goff.....	353 29 10.61	173 29 48.59	4.1032735

APPENDIX E

LIST OF GEOGRAPHIC POSITIONS FROM PRIMARY
TRAVERSE.

CENTRAL SECTION OF TOPOGRAPHY.

OHIO.

PRIMARY TRAVERSE.

The following geographic positions were determined by Mr. George T. Hawkins during the field season of 1899 from primary traverse beginning at St. Mary's Church in Toledo, the latitude and longitude of the church spire having been determined by the United States Lake Survey. Lines were extended from this position to control the Toledo, Oak Harbor, and Maumee Bay quadrangles.

Lines follow Lake Shore and Michigan Southern Railway from Toledo to State line northwest of Sylvania, and from Toledo to State line northeast of Alexis; Toledo, St. Louis and Kansas City Railroad from Toledo to Waterville; Hocking Valley Railway from Toledo to Lemoyne; Lake Shore and Michigan Southern Railway from Toledo to eastern edge of Oak Harbor quadrangle.

Geographic positions in Ohio.

Station.	Latitude.	Longitude.
	° ' "	° ' "
St. Mary's Church spire.....	41 39 33.02	83 32 03.71
Park, Lake Survey station.....	41 39 57.95	83 30 37.24
Summit avenue and Wheeling and Lake Erie Railroad crossing.....	41 40 41.8	83 29 49.8
Michigan and Ash streets, corner of.....	41 40 04.8	83 31 00.2
Ironville station, crossing at.....	41 40 19.0	83 29 05.3
Booth station, crossing east of.....	41 38 16.9	83 24 50.8
Curtis, crossing 1,000 feet east of.....	41 37 04.7	83 22 07.0
Trowbridge, crossing 150 feet east of.....	41 34 46.8	83 16 51.3
Trowbridge, 4½ miles southeast of; crossing 900 feet west of head block.....	41 33 00.3	83 12 46.8
Oak Harbor station, crossing 700 feet east of.....	41 31 11.8	83 08 44.4
Lacarne, crossing 2¾ miles east of.....	41 31 09.0	82 59 36.2
Lacarne, crossing 1,000 feet east of station.....	41 31 09.9	83 02 22.0
Bancroft street, Michigan Central Railroad crossing..	41 39 48.9	83 34 22.4
Bancroft street, Lake Shore Railway crossing.....	41 39 48.7	83 34 38.2
Ottawa Park, forks of road at southwest corner of...	41 39 47.2	83 36 28.8
Central avenue, crossing at.....	41 40 36.0	83 40 17.5
Sylvania, crossing 400 feet west of.....	41 42 30.8	83 42 06.6
State line, crossing of.....	41 43 30.8	83 42 34.7
State line, crossing one mile north of.....	41 44 21.2	83 43 27.0
West Toledo station.....	41 41 25.7	83 33 24.5

Geographic positions in Ohio—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Lake Shore Railway, crossing of pike.....	41	41	59.9	83	32	55.0
State line and Lake Shore Railway crossing.....	41	43	52.3	83	31	18.2
Schoolhouse, crossing at.....	41	44	23.6	83	30	51.2
Michigan Central and Toledo, St. Louis and Kansas City railroads crossing.....	41	37	34.4	83	34	24.4
Crossing 2 miles southwest of last.....	41	36	16.7	83	35	52.6
Maumee, crossing 320 feet northeast of station.....	41	33	56.5	83	39	20.3
Waterville, crossing $2\frac{1}{2}$ miles north of.....	41	32	11.3	83	42	36.2
Waterville station, first crossing south of.....	41	30	01.3	83	43	30.9
Fassett street, crossing at.....	41	37	43.8	83	31	41.3
Walbridge, first crossing south of.....	41	34	36.4	83	29	38.2
Lemoyne, crossing 2 miles north of.....	41	31	19.5	83	28	50.8
Lemoyne, crossing of pike at.....	41	29	45.2	83	28	27.0
Toledo, St. Louis, and Kansas City and Wabash rail- roads, crossing of.....	41	37	18.0	83	34	48.2
Crossing 2 miles southwest of Michigan Central Rail- road crossing.....	41	36	44.3	83	35	37.2
Michigan Central and Lake Shore railroads crossing...	41	38	20.9	83	34	25.6
Long Bridge, at east end of truss.....	41	37	53.2	83	32	21.6

PRIMARY TRAVERSE.

One hundred and ten geographic positions in northeastern Ohio were determined by primary traverse during October, November and December, 1900, by Mr. E. L. McNair, and based upon three stations of the United States Lake Survey—Claridon, Warrensville, and Grafton.

Circuits were completed as follows: I. Southward from Warrensville triangulation station to Hudson; thence to Ravenna; thence by highways northward to Claridon triangulation station. II. Southward from Hudson, located by first traverse, to Akron; westward to Sterling; thence northward to Grafton triangulation station. III. Westward from Sterling to the eighty-second meridian; thence southward to Wooster, eastward to Canton; thence northward, closing on Akron. A spur line was run from Wooster southwestward 4 miles to Millbrook. IV. Southward from Ravenna to Bayard, thence westward to Canton. V. Eastward from Bayard to Kensington triangulation station, which was located through a series of triangles 270 miles in axial length, based upon Maryland Heights, Sugar Loaf stations, and on United States standard datum of the Coast and Geodetic Survey.

The position of Kensington triangulation station, as computed through the traverse from the lake survey stations compared with that computed through the triangulation upon the United States standard datum, shows a discrepancy of 23 feet in latitude and 15 feet in longitude,

the latter giving a location north and west of the former. As this is a connection between two entirely different systems of triangulation the discrepancy is very small and is partly attributable to station error and partly to errors in the traverse lines and triangulation. This error was distributed in the traverse line between Bayard and Kensington.

Geographic positions between Warrensville triangulation station, United States Lake Survey, and Bedford, via highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Warrensville triangulation station.....	41 28 39.24	81 30 12.88
Randall station, Erie Railway, about one-fourth mile west of, road crossing near post-office.....	41 25 42.6	81 32 12.0
Bedford station, Cleveland and Pittsburg Railway...	41 23 24.1	81 32 09.8

Geographic positions along Cleveland and Pittsburg Railway, between Bedford and Kensington.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Macedonia station.....	41 18 48.3	81 30 37.3
Hudson, Western Reserve Academy Observatory....	41 15 37.6	81 26 14.9
Portage and Summit, county line.....	41 12 45.3	81 23 33.2
Earlville station.....	41 11 21.0	81 20 42.8
Erie Railway crossing.....	41 10 18.4	81 18 40.7
Ravenna, Main street crossing.....	41 09 28.0	81 14 52.5
Ravenna, Pittsburg and Western Railway crossing...	41 08 56.4	81 14 44.6
Rootstown station, road crossing 150 feet north of...	41 06 18.4	81 12 52.7
Road crossing 15 feet south of milepost 45.....	41 04 38.2	81 11 40.5
Road crossing 655 feet north of milepost 48.....	41 02 21.2	81 10 20.6
Atwater station road crossing 295 feet south of.....	41 01 25.4	81 09 50.8
Portage and Stark counties, road crossing on county line.....	40 59 17.4	81 08 41.2
Road crossing 1,695 feet south of milepost 55.....	40 56 27.5	81 06 57.0
Alliance, Alliance and Northern Railway crossing....	40 55 33.0	81 06 04.4
Alliance, Pittsburg, Fort Wayne and Chicago crossing	40 55 18.6	81 05 45.0
Alliance station.....	40 55 17.1	81 05 43.2
Stark and Mahoning counties, road crossing on county line.....	40 54 44.1	81 05 13.8
Road crossing 1,070 feet north of milepost 61.....	40 52 20.4	81 04 08.3
Homeworth station, road crossing 55 feet south of...	40 50 14.8	81 04 04.4
Moultrie station, road crossing 255 feet south of....	40 47 47.8	81 04 14.3
Bayard station.....	40 45 02.7	81 03 58.4
East Rochester station, road crossing 700 feet east of	40 44 41.8	81 02 06.3
Hanover-West township line.....	40 44 00.5	80 58 32.2
Kensington station, road crossing 150 feet west of...	40 44 05.3	80 57 23.3
Kensington triangulation station.....	40 43 20.6	80 56 40.5

Geographic positions along Cleveland, Akron and Columbus Railway, Hudson to Akron.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Flag station, road crossing at 1,770 feet south of milepost 3.....	41	11	52.4	81	27	53.8
Road crossing 1,370 feet north of milepost 6.....	41	09	50.3	81	28	10.8
Cuyahoga Falls station.....	41	08	06.9	81	28	52.0
Road crossing 1,925 feet south of milepost 10.....	41	06	08.1	81	29	23.0
Cleveland, Terminal and Valley Railway crossing, stone arch.....	41	05	08.5	81	29	24.3
Akron, Union station.....	41	04	58.7	81	30	34.8
Akron, court-house grounds, south meridian mark...	41	04	44.3	81	31	05.0
Akron, court-house grounds, north meridian mark...	41	04	47.8	81	31	05.0

Geographic positions along Erie Railway, Akron to Burbank.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Akron, Erie station, $2\frac{7}{8}$ miles west of, old canal crossing.....	41	02	46.1	81	32	35.7
Road crossing (Baltimore and Ohio Railway) 2,200 feet southwest of milepost 18.....	41	01	56.4	81	34	52.1
Barberton station.....	41	01	13.2	81	36	36.5
Sherman station.....	41	00	50.4	81	40	05.0
Wadsworth station.....	41	01	02.7	81	43	46.6
Road crossing one-half mile west of milepost 217....	40	59	46.5	81	44	55.5
Rittman station.....	40	58	06.4	81	46	55.2
Sterling; Cleveland, Lorain and Wheeling crossing...	40	58	10.9	81	50	52.7
Creston station.....	40	58	56.6	81	53	33.2
Road crossing 370 feet east of water tank.....	40	59	22.8	81	57	30.2
Burbank station.....	40	59	24.2	81	59	50.1
Baltimore and Ohio crossing (Lodi and Wooster branch).....	40	59	19.4	82.01	33.7	

Geographic positions along Cleveland, Lorain and Wheeling Railway, from Sterling to Grafton triangulation station (United States Lake Survey).

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Sterling, Erie Railway crossing.....	40	58	10.9	81	44	55.5
Seville station.....	41	00	30.5	81	51	50.5
Road crossing 2,340 feet south of milepost 39.....	41	02	39.8	81	53	04.0
Flag station 400 feet south of milepost 37.....	41	04	37.6	81	53	39.8
Road crossing 250 feet north of milepost 34.....	41	07	16.1	81	53	03.3
Medina station.....	41	08	18.8	81	52	24.3
Road crossing 2,150 feet south of milepost 29.....	41	10	01.9	81	55	13.2
Lester station.....	41	10	48.2	81	56	31.5
Erhart station.....	41	11	55.2	81	58	21.1
Grafton triangulation station (United States Lake Survey).....	41	12	44.21	81	59	37.85

Geographic positions along Lodi and Wooster branch of Baltimore and Ohio Railroad, from Erie crossing to Wooster.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Erie crossing.....	40	59	19.4	82	01	33.7
Road crossing at flag station.....	40	57	08.3	82	01	27.7
Armstrong flag station.....	40	54	42.0	82	00	34.0
Overton flag station.....	40	51	51.0	82	00	32.3
Road crossing 600 feet south of water tank.....	40	48	38.1	81	58	51.0
Wooster fair grounds, south meridian mark.....	40	47	50.3	81	57	03.5
Wooster fair grounds, north meridian mark.....	40	47	55.6	81	57	03.5
Wooster station, Baltimore and Ohio R. R.....	40	47	43.6	81	56	55.1

Geographic positions along Pittsburg, Fort Wayne and Chicago Railway, from Millbrook to Orrville.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Bridge 121, northwest corner of, copper bolt in bridge abutment.....	40	43	59.9	81	58	24.6
Road crossing 100 feet east of bridge 121.....	40	44	00.7	81	58	23.8
Overhead road crossing.....	40	44	51.8	81	57	41.4
Baltimore and Ohio overhead crossing.....	40	46	32.6	81	56	47.7
Wooster station.....	40	47	57.0	81	55	54.8
Stone arch culvert, 1,040 feet north of milepost 132..	40	49	09.8	81	53	19.6
Smithville station.....	40	50	25.5	81	51	40.9
Road crossing about one-third mile east of water tank	40	49	46.0	81	48	35.0
Orrville, Pittsburg, Fort Wayne and Chicago and Cleveland, Akron and Columbus Rwy.....	40	50	22.1	81	46	05.8

Geographic positions along Wheeling and Lake Erie Railway, between Orrville and Massillon.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Burton City station.....	40 50 36.5	81 42 12.1
Dalton station.....	40 48 02.0	81 41 15.2
Pocock mine junction.....	40 48 20.7	81 38 43.9
Sippo station, road crossing 325 feet west of.....	40 48 56.4	81 36 05.9
Sherwood flag station, road crossing at.....	40 48 19.8	81 33 17.9
Massillon, crossing of Wheeling and Lake Erie and Cleveland, Lorain and Wheeling Rwys.....	40 47 43.5	81 31 47.3

Geographic positions along Pittsburg, Fort Wayne and Chicago Railway between Massillon and Canton.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Massillon, East street crossing.....	40 47 32.4	81 31 01.2
Road crossing 2,150 feet east of milepost 107.	40 47 11.6	81 27 57.6
Road crossing 700 feet west of milepost 104.....	40 46 54.1	81 25 11.8
Canton, Pittsburg, Fort Wayne and Chicago Rwy. and Cleveland Terminal and Valley Rwy. crossing	40 47 24.2	81 23 02.1

Geographic positions along the Cleveland Terminal and Valley Railway, between Canton and Akron.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Canton station.....	40 48 01.5	81 23 16.1
Road crossing 1,525 feet south of milepost 54.	40 51 16.8	81 24 49.2
New Berlin station, road crossing 65 feet north of.	40 52 54.0	81 25 32.3
Greentown station, road crossing 245 feet north of.	40 55 42.5	81 25 10.8
Myersville station, road crossing 215 feet north of.	40 58 34.0	81 25 36.7
Road crossing 280 feet north of milepost 44.....	40 59 41.9	81 26 44.5
Krumroy station, road crossing 225 feet south of.	41 00 55.3	81 28 42.8
Overhead road crossing 425 feet south of milepost 39	41 03 07.2	81 28 37.0

Geographic positions along Wheeling and Lake Erie Railway, between Canton and Minerva.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Canton, crossing of Pittsburg, Fort Wayne and Chicago Rwy.....	40 47 43.3	81 22 07.3
Road crossing 1,820 feet west of milepost 63.....	40 46 26.4	81 19 17.9
Osnaburg station road crossing, 425 feet east of.	40 47 03.7	81 16 59.6
Road crossing 1,650 feet east of milepost 67.....	40 45 58.0	81 14 51.9
Robertsville station, road crossing 90 feet west of.	40 45 38.9	81 11 21.6
Road crossing 180 feet south of milepost 73.....	40 44 54.2	81 09 24.0
Road crossing 450 feet south of milepost 75.....	40 43 09.5	81 09 11.8
Minerva crossing of Cleveland and Pittsburg Rwy. (new Philadelphia branch) along Cleveland and Pittsburg Rwy.....	40 43 31.5	81 06 26.2
Minerva station, Cleveland and Pittsburg Rwy., road crossing, about 2,200 feet northeast of.....	40 43 40.3	81 06 09.9

Geographic positions along highway from Ravenna northward to Claridon triangulation station (United States Lake Survey).

Station.	Latitude.	Longitude.
	° ' "	° ' "
Shalersville, 2½ miles south of, 4 corners.....	41 12 07.4	81 14 47.1
Shalersville, intersection of roads at.....	41 14 19.8	81 13 53.6
Mantua station, Erie Railway crossing near.....	41 16 52.8	81 13 28.8
Mantua postoffice, road intersection at	41 18 37.3	81 13 19.2
Julia postoffice, county line between Portage and Geauga county.....	41 20 50.8	81 13 27.3
Auburn, road intersection at store.....	41 23 14.0	81 13 00.2
South Newberry post-office, 2,000 feet south of, and ½ mile south of creamery, electric railway crossing...	41 25 58.4	81 12 32.9
Burton, 2¾ miles southeast of, 4 corners.....	41 26 59.7	81 10 53.4
Burton, street intersection, north side of park.....	41 28 21.4	81 08 43.9
Burton, about 1½ miles north of, 4 corners.....	41 29 49.5	81 08 43.8
Claridon triangulation station (U. S. Lake Survey)....	41 30 39.61	81 07 06.27

PRIMARY TRAVERSE.

The following geographic positions were determined from primary traverse in 1900 by Mr. George T. Hawkins, topographer.

Starting from United States Coast and Geodetic Survey astronomic pier at Mount Lookout, Cincinnati, the line follows the Baltimore and Ohio Southwestern and Baltimore and Ohio railroads to Columbus, Ohio; thence along the Hocking Valley Railroad to Toledo, Ohio, where it was tied to St. Mary's church spire (United States Lake Survey station); thence back to Columbus, following line of Toledo and Ohio Central Railway, and connected with original line. Meridian lines were established at Bowling Green, Delaware, Findlay, Kenton, Marysville, Upper Sandusky, and Washington Court House.

Geographic Positions along Baltimore and Ohio Southwestern and Baltimore and Ohio Railroads from Cincinnati to Columbus.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Cincinnati, Mount Lookout astronomic pier.	39	08	21.93	84	25	21.52
Madisonville station.....	39	09	26.0	84	23	49.0
East Madisonville station.....	39	09	35.3	84	23	10.0
Madeira station.....	39	11	17.0	84	21	45.9
Allandale station.....	39	11	49.2	84	20	34.4
Remington station.....	39	13	35.8	84	19	26.7
Symmes station.....	39	14	50.0	84	17	45.8
Camp Ground station.....	39	15	18.2	84	16	47.5
Loveland, crossing of Pennsylvania and Baltimore and Ohio Southwestern railways.....	39	16	00.6	84	15	31.9
Hills station crossing 350 feet west of.....	39	15	18.7	84	11	17.7
Cozaddale station, crossing 80 feet west of.....	39	16	15.2	84	09	39.9
Pleasant Plain station, crossing 110 feet west of....	39	16	47.5	84	06	43.6
Windsor station, crossing 40 feet west of.....	39	17	04.6	84	02	59.5
Blanchester station, crossing 320 feet east of.....	39	17	31.4	83	59	14.2
Midland station, crossing 310 feet west of.....	39	18	13.7	83	54	35.4
Midland station.....	39	18	14.4	83	54	31.5
Cuba station, crossing under railway 300 feet south of.	39	21	41.0	83	51	58.1
Milepost 52, crossing 450 feet north of.....	39	23	59.4	83	51	17.8
Wilmington, Baltimore and Ohio station at.....	39	26	36.6	83	49	25.2
Blind siding, crossing 450 feet west of head block at. .	39	27	56.2	83	45	05.3
Melvin station, crossing 200 feet east of.....	39	28	24.8	83	43	01.2
Reesville, crossing at.....	39	28	57.1	83	40	41.2
Sabina station, crossing 100 feet west of.	39	29	33.6	83	38	07.4
Milepost 69, crossing 800 feet west of.....	39	30	12.2	83	35	19.4
Rattlesnake, crossing over railroad at.....	39	30	41.8	83	33	09.4

Geographic positions along Baltimore and Ohio Southwestern and Baltimore and Ohio Railroads from Cincinnati to Columbus.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Jasper Mills, crossing at.....	39 31 08.0	83 31 14.4
Washington Court-House, south azimuth stone 1,400 feet southward from Baltimore and Ohio station, near coal chutes 6 feet east of main track, 11 feet from end of bulkhead leading to elevated tracks. A limestone post, 36 by 8 by 8 inches, set 33 inches in the ground, in the center of top of which is cemented a bronze meridian tablet. Distant mark is a copper bolt cemented in east abutment of wagon bridge. Azimuth 218° 12' 45". Distance from south stone 1,093 feet.....	39 32 04.0	83 26 53.7
Washington Court-House, crossing of Baltimore and Ohio and Cincinnati, Hamilton and Dayton railways	39 32 13.3	83 26 43.4
Fayette station.....	39 34 09.9	83 25 13.7
Bloomingsburg station, crossing 300 feet east of.....	39 36 22.7	83 23 17.4
Madison Mills station, crossing 30 feet east of.....	39 39 13.5	83 20 21.4
Cook station, crossing 200 feet east of.....	39 40 59.4	83 18 24.3
Mount Sterling station, 300 feet east of Main street crossing.....	39 43 17.6	83 16 03.7
Era station, crossing 430 feet west of.....	39 44 23.2	83 14 38.1
Derby station, crossing 350 feet west of.....	39 46 08.4	83 12 20.5
Morgan station, crossing 100 feet west of.....	39 48 17.8	83 09 19.5
Pleasant corners station, crossing 100 feet southwest of.....	39 50 37.5	83 07 41.1
Grove City station, crossing 100 feet southwest of.....	39 52 59.7	83 05 44.3
Urbancrest station, crossing 100 feet northeast of.....	39 53 53.2	83 05 00.4
Briggsdale station, crossing 50 feet northeast of.....	39 55 36.0	83 03 36.1
United States Geological Survey triangulation station, north base.....	39 55 57.3	83 03 18.6
Columbus, crossing Baltimore and Ohio Railway and Broad street.....	39 57 31.9	83 01 54.4

Positions along Hocking Valley Railway from Columbus to Toledo.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Crossing Hocking Valley Railway and pike road east and west.....	39 59 16.8	83 01 37.1
Columbus, Lane avenue station, crossing 150 feet south of.....	40 00 24.3	83 01 55.5
Olentangy station, crossing under railway 550 feet north of.....	40 03 48.5	83 02 48.1
Elmwood station, crossing 200 feet south of.....	40 05 25.2	83 03 09.4
Milepost 113, crossing 850 feet north of.....	40 07 01.8	83 03 30.7
Powell station, crossing 160 feet south of.....	40 09 29.6	83 04 42.3
Milepost 107, crossing 170 feet south of.....	40 11 44.5	83 05 22.7
Hyatts station, crossing 1,200 feet south of.....	40 12 58.3	83.05 17.6
Milepost 103, crossing 340 feet south of.....	40 15 12.6	83 05 08.5
Crossing telephone line.....	40 17 18.3	83.04 59.84
Delaware, south azimuth stone, 30 feet southeast of "Big Four" and Hocking Valley railways. A limestone post, 28 by 6 by 6 inches, set 28 inches in the ground, in the center of top of which is cemented a bronze meridian tablet. Azimuth 185° 10'.....	40 17 34.5	83 04 58.4
Delaware, north azimuth stone, 105 feet north of center of street and 72 feet east of railroad. A limestone post, 36 by 6 by 6 inches, set 30 inches in the ground; in center of top is cemented a copper bolt. Azimuth 5° 10'.....	40 17 47.0	83 04 56.9
Delaware station, crossing 50 feet north of.....	40 17 58.7	83 04 57.4
Siding, crossing 150 feet south of south end of.....	40 20 00.3	83 06 03.3
Milepost 95, crossing 200 feet north of.....	40 21 51.6	83 07 15.9
Radnor station, crossing 160 feet north of.....	40 23 09.6	83 08 06.0
Mileposts 90 and 91, crossing halfway between.....	40 25 22.7	83 09 39.1
Prospect station, crossing at.....	40 27 06.1	83 10 45.7
Crossing, four corners.....	40 29 28.0	83 09 59.3
Owen station, crossing 600 feet north of.....	40 31 13.2	83 09 28.6
Mileposts 79 and 80, crossing halfway between.....	40 34 31.3	83 08 30.8
Marion station, 140 feet south of Main street crossing..	40 35 19.2	83 08 28.0
Marion, south azimuth stone, 225 feet north of "Big Four" crossing and 45 feet north of tool house, between Y tracks and main line of Hocking Valley Railway. A limestone post, 40 by 7 by 6 inches, set 40 inches in the ground, in the center of top of which is cemented a bronze meridian tablet. Distant mark is spire of Catholic Church. Azimuth of same is 259° 11' 30".....	40 35 25.0	83 08 30.1
Crossing under railroad.....	40 38 01.5	83 10 25.1
Morrall station, crossing, 160 feet north of.....	40 41 12.4	83 12 45.6
T. 3 S., R. 14 E., $\frac{1}{4}$ corner between secs. 33 and 34...	40 44 17.6	83 14 44.8

Positions along Hocking Valley Railway from Columbus to Toledo.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Harpster station.....	40 44 20.4	83 15 04.2
Milepost 63, crossing 1,180 feet north of.....	40 47 19.8	83 17 12.1
Upper Sandusky, south azimuth stone, 9 feet east of railway and 1,395 feet distant from north stone. A limestone post, 30 by 5 by 5 inches, set 30 inches in the ground, in the center of top of which is cemented a bronze meridian tablet. Azimuth 180° 18' 30".....	40 49 14.8	83 17 31.4
Upper Sandusky, north azimuth stone, 55 feet south and 150 feet east of crossing of Pittsburg, Fort Wayne and Chicago Railway and Hocking Valley Railway, 11 feet east of Hocking Valley Railway. A limestone post 38 by 6 by 6 inches, set 34 inches in the ground, in center of top is cemented a copper bolt.....	40 49 28.6	83 17 31.3
Upper Sandusky station.....	40 49 30.0	83 17 31.3
T. 2 S., R. 14 E., west corner of secs. 19 and 30.....	40 50 49.7	83 18 16.6
Crossing at flag station.....	40 53 26.8	83 19 54.7
Crawford station, crossing at.....	40 55 05.2	83 21 03.8
Carey station, crossing outh of.....	40 57 04.2	83 22 28.3
Carey, south azimuth stone. A copper bolt sunk and cemented in south abutment of bridge north of station, on second stone and 4 feet east of east rail. Azimuth 151° 40' 20" to north mark.....	40 57 10.3	83 22 32.6
Carey, north azimuth stone, 339 feet north of "Big Four" crossing, 8 feet southeast of Northern Ohio crossing and 3½ feet east of east rail on Hocking Valley Railway. A marble post 24 by 8 by 8 inches, set 24 inches in the ground, in center of top is cemented a copper bolt.....	40 57 22.9	83 22 41.5
¼ corner north of sec. 5 on base line, range 13 E.....	40 59 31.7	83 23 49.1
Milepost 45, crossing 900 feet north of.....	41 01 43.4	83 24 16.0
Alvada station, crossing 100 feet north of.....	41 03 00.7	83 24 24.1
Siding, crossing 190 feet south of south end of.....	41 05 38.5	83 24 23.1
Crossing of telephone line.....	41 07 23.2	83 24 24.0
Fostoria, south azimuth stone, 7 feet east, of east rail on Hocking Valley Railway, in arch culvert east of Fostoria Bulb and Bottle Co.'s works. A bronze meridian tablet cemented in culvert. Azimuth 179° 35' 25".....	41 08 38.8	83 24 24.6
Fostoria, north azimuth stone, 500 feet south of Baltimore and Ohio and Hocking Valley crossing, and 7 feet east of east rail of Hocking Valley Railway. A sandstone post 36 by 8 by 8 inches, set 34 inches		

Positions along Hocking Valley Railway from Columbus to Toledo.—Concluded.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
in the ground, in the center of top is cemented a copper bolt.....	41	09	01.2	83	24	24.8
Fostoria, Hocking Valley Railway, and Toledo and Ohio Central Railway, and street-car crossing....	41	09	13.0	83	24	25.6
Fostoria station, Hocking Valley Railway.....	41	09	40.7	83	24	37.1
Milepost 33, crossing 1,300 feet north of.....	41	12	11.9	83	25	02.2
Longley station, crossing 320 feet north of.....	41	13	20.6	83	25	14.3
T. 3 N., Rs. 12 and 13 E., cor. sec. 7, 18, 13, 12.....	41	13	29.6	83	25	13.7
Risingsun station, crossing 130 feet south of.....	41	16	06.8	83	25	43.4
T. 4 N., R. 12 E., corner secs. 11, 12, 13, 14.....	41	18	43.5	83	26	14.6
Bradner station, crossing 150 feet north of.....	41	19	22.6	83	26	17.8
Milepost 21, crossing 840 feet south of.....	41	22	12.1	83	26	47.5
Pemberville station, crossing 80 feet north of.....	41	24	28.6	83	27	11.3
T. 5 N., R. 12 E., corner secs. 2, 3, 10, 11.....	41	24	49.6	83	27	16.7
Milepost 16, crossing 480 feet south of.....	41	26	33.2	83	27	39.9
Lemoine station.....	41	29	39.6	83	28	25.7
Pike crossing.....	41	29	45.2	83	28	27.0

Positions along the Toledo and Ohio Central Railway between Toledo and Columbus.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Lime city, crossing of telephone line road at.....	41	32	06.2	83	34	01.8
Crossing of telephone line road.....	41	29	50.4	83	35	15.5
Dowling station, crossing 250 feet north of.....	41	28	40.4	83	35	53.6
Dowling, 1¼ miles southeast of, cor. secs. 20, 21, 28, 29	41	27	27.8	83	36	35.4
Telephone line road.....	41	25	13.3	83	37	46.2
Bowling Green station, 200 feet north of, telephone road crossing.....	41	22	33.2	83	38	40.8
Corner Ts. 4 and 5 N., Rs. 10 and 11 E.....	41	20	31.3	83	39	02.4
Portage station, crossing 150 feet south of.....	41	19	35.9	83	38	44.8
Mermill station, crossing 200 feet north of.....	41	17	51.0	83	38	44.3
Corner Ts. 3 and 4 N., Rs. 10 and 11 E.....	41	15	14.0	83	39	00.6
Cygnat station, crossing 270 feet north of.....	41	14	23.5	83	38	43.3
Milepost 32, crossing at.....	41	12	40.0	83	38	42.8
West corner secs. 30 and 31, T. 3 N., R. 11 E.....	41	10	55.8	83	38	57.6
Galatea, Baltimore and Ohio, and Toledo and Ohio Central crossing.....	41	10	40.8	83	38	42.8
Vanburen station, crossing 120 feet south of.....	41	08	17.5	83	38	42.8
Mortimer, crossing 465 feet south of railways.....	41	06	33.4	83	38	42.9
Mortimer station.....	41	06	38.0	83	38	42.9

Positions along the Toledo and Ohio Central Railway between Toledo and Columbus.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Corner Ts. 1 and 2 N., Rs. 10 and 11 E.....	41 04 49.9	83 38 58.3
North Findlay, crossing of Lake Erie and Western Railway.....	41 02 50.7	83 38 42.2
Findlay, north azimuth stone at 790 feet north of "Big Four" crossing, 320 feet north of street, and 5 feet east of east rail of Toledo and Ohio Central Railway. A limestone post 36 by 7 by 5 inches, set 34 inches in the ground. A copper bolt is cemented in top..	41 02 23.4	83 38 38.9
Findlay, south azimuth stone, 268 feet south of "Big Four" crossing, 4 feet north of sidewalk on Main street, and 17 feet west of west rail of Toledo and Ohio Central Railway. A limestone post 40 by 7 by 5 inches, set 36 inches in ground, in center of top of which is cemented a bronze meridian tablet. Azi- muth 178° 02' 30" to north stone.....	41 02 15.0	83 38 38.5
Findlay station.....	41 02 11.0	83 38 37.9
Findlay, crossing of Toledo and Ohio Central Railway and Findlay, Fort Wayne and Western Railway...	41 01 20.4	83 38 32.2
Milepost 46, crossing 250 feet south of.....	41 00 23.2	83 38 28.1
Base line crossing.....	40 59 36.0	83 38 27.9
Milepost 49, crossing 130 feet south of.....	40 57 53.4	83 38 33.5
Milepost 51, crossing 200 feet south of.....	40 56 08.2	83 38 32.4
Corner Ts. 1 and 2 S., Rs. 10 and 11 E.....	40 54 23.3	83 39 03.7
Northern Ohio Railway crossing.....	40 53 56.8	83 38 48.7
Arlington station, crossing 180 feet north of.....	40 53 34.9	83 38 48.9
Milepost 56, crossing 470 feet south of.....	40 51 46.2	83 38 49.6
Williamstown station, crossing 70 feet south of.....	40 50 01.6	83 38 49.8
Corner Ts. 2 and 3 S., Rs. 10 and 11 E.....	40 49 09.7	83 39 04.6
Dunkirk station, crossing 900 feet north of.....	40 47 24.5	83 38 49.8
Pittsburg, Fort Wayne and Chicago Railway crossing	40 47 17.9	83 38 49.9
Milepost 64, crossing 910 feet south of.....	40 44 46.5	83 38 34.9
Blanchard station, 150 feet north of; telephone line road crossing.....	40 43 54.2	83 38 35.6
Milepost 67, crossing 500 feet south of.....	40 42 14.0	83 38 36.1
Milepost 69, crossing under railway 450 feet south of	40 40 30.3	83 38 35.1
Pike crossing.....	40 39 19.2	83 37 59.9
Kenton, northwest azimuth stone 9 feet south of south rail on Toledo and Ohio Central Railway and 12 feet northwest of switch block. A sandstone post 30 by 6 by 6 inches, set 28 inches in ground, in center of top of which is cemented a bronze meridian tablet. Azimuth 273° 48' 22" to southeast stone.....	40 38 40.8	83 36 58.1
Kenton, southeast azimuth stone on middle pier of "Big Four" Railway bridge over Scioto River and		

Positions along the Toledo and Ohio Central Railway between Toledo and Columbus.—Concluded.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Toledo and Ohio Central Railway; 15 feet south of Toledo and Ohio Central Railway and $3\frac{1}{2}$ feet west of west rail of "Big Four" Railway. A copper bolt in top of stonework.....	40 38 40.0	83 36 42.2
Kenton station, street crossing 140 feet east of.....	40 38 36.9	83 36 29.2
Erie Railway crossing.....	40 38 00.6	83 35 47.2
Siding, crossing 70 feet north of north end of.....	40 34 35.9	83 34 29.9
"Big Four" Railway crossing.....	40 31 09.6	83 33 47.6
Ridgeway station, crossing 175 feet south of.....	40 30 57.9	83 33 46.1
Mileposts 83 and 84, crossing halfway between 1,450 feet north of creek.....	40 29 21.1	83 33 33.6
Milepost 86, crossing 480 feet north of.....	40 27 11.0	83 33 16.9
West Mansfield, main road running north from.....	40 24 34.3	83 32 46.7
Milepost 91, crossing 830 feet south of.....	40 22 59.3	83 31 24.0
Lunda station, crossing 400 feet south of.....	41 21 59.2	83 30 31.7
Raymonds station, crossing 180 feet northwest of....	40 19 56.2	83 28 11.5
Peoria, Erie Railway crossing at.....	40 18 39.2	83 27 04.0
Milepost 98, crossing 1,340 feet south of.....	40 18 05.4	83 26 34.9
Siding, crossing 120 feet north of north end of.....	40 16 28.9	83 25 11.7
Marysville station, crossing 100 feet east of.....	40 14 25.7	83 22 13.5
Marysville, north azimuth stone at 940 feet north of "Big Four" crossing, 450 feet north of north end of Y 200 feet north of east and west road, and 16 feet east of east rail of Toledo and Ohio Central Railway. A sandstone post 30 by 6 by 6 inches, set 26 inches in ground; in center of top is cemented a copper bolt	40 14 12.8	83 21 15.7
Marysville, south azimuth stone at 613 feet south of crossing of "Big Four" Railway, 6 feet east of east rail of Toledo and Ohio Central Railway. A sandstone post 30 by 6 by 6 inches, set 28 inches in ground, in center of top of which is cemented a bronze meridian tablet. Azimuth $139^{\circ}43'20''$ to north stone	40 14 01.1	83 21 02.8
Milepost 106, 330 feet south of pike and telephone line crossing.....	40 13 36.3	83 20 36.1
Milepost 108, crossing 1,350 feet south of.....	40 12 08.2	83 19 00.5
Blind siding, crossing 20 feet northwest of headblock..	40 10 06.4	83 16 48.5
Milepost 113, pike crossing 530 feet southeast of.....	40 08 54.0	83 15 30.0
Arnold station, 580 feet southeast of pike and telephone line crossing.....	40 08 27.4	83 15 01.2
Flag station, telephone line 200 feet southeast of.....	40 06 15.6	83 12 38.5
Amlin station crossing, 100 feet northwest of.....	40 04 36.4	83 10 51.1
Milepost 122, crossing 300 feet southeast of.....	40 02 54.5	83 09 01.0
Telephone line crossing.....	40 01 56.6	83 07 58.4
Toledo and Ohio Central Railway and Pennsylvania Railway crossing.....	40 00 04.5	83 05 57.4
Milepost 127, crossing at.....	39 59 36.1	83 05 26.7

PRIMARY TRAVERSE.

During the month of October, 1901, Mr. Sledge Tatum, topographer, controlled, by means of 140 miles of primary traverse, four quadrangles in the north-central portion of the State, in Lorain, Huron, Medina, Richland, Ashland and Wayne counties.

The traverse is based upon Camden and Townsend triangulation stations of the United States Lake Survey and on points near Millbrook and Burbank, established in 1900 from primary traverse by Mr. E. L. McNair.

Geographic positions along Baltimore and Ohio Railroad (Lodi and Wooster branch) from Erie Railroad crossing to Lodi.

Station.	Latitude.	Longitude.
	° ' "	' "
Erie and Baltimore and Ohio R. R. crossing.....	40 59 19.4	82 01 33.7
Burbank, 2 miles west of, road crossing.....	41 00 04.6	82 01 09.0

Geographic positions along Baltimore and Ohio Railroad (main line) from Lodi to Greenwich.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Lodi, junction main line and branch, point 70 feet west of tool house.....	41 01 39.3	82 01 04.6
Road crossing.....	41 00 51.8	82 02 48.0
Road crossing.....	41 00 51.6	82 03 17.7
Road crossing.....	41 00 49.5	82 04 41.5
Road crossing.....	41 01 05.0	82 05 50.6
Homer station, road crossing 770 feet east of.....	41 01 03.6	82 07 16.4
Road crossing.....	41 01 32.4	82 08 44.1
Road crossing.....	41 01 50.2	82 09 49.6
Road crossing.....	41 01 54.2	82 12 06.0
Sullivan station, road crossing west of.....	41 01 55.0	82 13 20.4
Road crossing.....	41 01 56.3	82 15 36.6
Road crossing.....	41 01 57.0	82 16 50.3
Road crossing.....	41 01 57.9	82 18 18.3
Road crossing.....	41 02 33.7	82 20 46.1
Road crossing.....	41 03 19.4	82 22 32.7
Hereford station.....	41 03 34.3	82 23 37.9
Rumley station.....	41 03 03.7	82 26 08.7
Road crossing.....	41 02 17.3	82 29 09.3
Road crossing.....	41 02 05.9	82 30 01.0
Greenwich station, street crossing 100 feet east of.....	41 02 04.7	82 30 40.1

Geographic positions along highways from Greenwich to Mansfield.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road west.....	41	00	40.6	82	30	36.0
United Brethren Church.....	40	59	35.0	82	30	28.0
Crossroads.....	40	59	34.1	82	29	13.2
Crossroads.....	40	58	31.7	82	29	32.8
Road east.....	40	57	11.9	82	29	42.3
Crossroads.....	40	56	19.0	82	29	41.6
Road east.....	40	55	25.3	82	29	51.4
Shenandoah, crossroads at.....	40	54	42.6	82	29	58.0
Road west.....	40	53	41.0	82	30	16.6
Road west.....	40	53	07.5	82	30	47.3
Road east.....	40	52	21.4	82	30	50.4
Crossroads.....	40	50	53.7	82	30	49.0
Road west.....	40	49	19.8	82	30	47.9
Road east.....	40	47	55.5	82	30	48.5
Mansfield, flagstaff of State reformatory.....	40	46	57.6	82	30	11.1

Geographic positions along highways from Mansfield to Millbrook via Hayesville.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road crossing.....	40	45	28.1	82	29	39.9
Road crossing.....	40	45	37.7	82	28	28.8
Road south.....	40	45	56.7	82	27	19.6
Road south.....	40	45	56.6	82	26	16.4
Brick schoolhouse.....	40	45	57.5	82	25	40.3
Road crossing.....	40	46	02.2	82	23	51.9
Petersburg, road crossing at.....	40	46	25.1	82	21	50.0
Road crossing.....	40	46	22.5	82	20	22.7
Road south.....	40	46	19.3	82	18	58.2
Road south.....	40	46	19.6	82	17	15.9
Hayesville, street crossing at.....	40	46	21.6	82	16	02.7
Road north.....	40	46	18.8	82	13	52.3
Road south.....	40	46	18.1	82	12	46.6
Road crossing.....	40	46	14.0	82	11	04.4
Road north.....	40	45	41.6	82	09	23.3
Lakefork, forks of road at.....	40	44	54.8	82	08	26.5
Road crossing.....	40	45	13.7	82	06	50.8
Blachleyville, street crossing at.....	40	45	51.0	82	04	54.7
Road crossing.....	40	44	43.3	82	02	52.8
Road north.....	40	43	51.4	82	00	26.9
Pittsburg, Fort Wayne and Chicago Rwy. bridge No. 121, near Millbrook; copper bolt in bridge abut- ment at northwest corner of.....	40	43	51.9	81	51	24.6

Geographic positions along highways from a point about $4\frac{1}{2}$ miles east of Hayesville northward, via Polk, Sullivan, and Wellington, to Camden triangulation station of United States Lake Survey.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Ashland and Wooster Rwy., crossing of.....	40	47	57.9	82	11	37.8
Crossroads.....	40	49	39.8	82	12	37.3
Crossroads.....	40	52	15.7	82	12	42.6
Crossroads.....	40	54	03.7	82	12	48.3
Polk, Erie R. R. crossing.....	40	57	00.7	82	12	53.9
Crossroads.....	40	58	25.9	82	12	55.2
Crossroads.....	40	59	31.7	82	13	23.6
Sullivan, bronze tablet in public school building....	41	01	47.3	82	13	07.6
Sullivan, Baltimore and Ohio R. R. crossing.....	41	01	55.0	82	13	20.4
Crossroads.....	41	03	27.8	82	13	16.3
Crossroads.....	41	05	04.8	82	13	16.2
Road east.....	41	06	58.5	82	13	12.2
Crossroads.....	41	08	52.3	82	13	06.0
Wellington station, Wheeling and Lake Erie R.R....	41	09	48.2	82	13	29.9
Wheeling and Lake Erie R. R., crossing of.....	41	10	10.1	82	16	31.0
Brighton, crossroads at.....	41	10	15.8	82	18	34.1
Road west.....	41	12	55.1	82	18	22.6
Lake Shore and Michigan Southern Rwy., crossing of.....	41	16	04.3	82	18	08.7
Camden triangulation station, United States Lake Survey.....	41	16	26.0	82	17	46.7

Geographic positions along highways from Townsend triangulation station of the United States Lake Survey south to Greenwich.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Townsend triangulation station, United States Lake Survey.....	41	15	43.5	82	29	00.6
Lake Shore and Michigan Southern Railway, crossing of.....	41	15	29.0	82	29	31.0
Road east.....	41	13	19.0	82	29	29.9
Crossroads.....	41	10	31.0	82	29	25.6
Road west.....	41	08	40.1	82	30	51.2
Road west.....	41	07	49.0	82	31	13.2
Crossroads.....	41	06	08.6	82	30	49.6
Road east.....	41	03	53.4	82	30	44.8
Greenwich, bronze tablet in base of standpipe at city waterworks.....	41	01	37.3	82	31	13.5

CENTRAL SECTION OF TOPOGRAPHY.

OHIO.

PRIMARY TRAVERSE.

Twenty-seven 15-minute quadrangles, covering portions of 18 counties in the northwestern portion of the State, were controlled or partly controlled by 160 miles of primary traverse along railways by Mr. George T. Hawkins, topographer, supplemented by 700 miles of traverse run by Mr. J. R. Ellis along highways, following meridians and parallels as closely as practicable.

The following geographic positions were determined from primary traverse in 1901 by Mr. George T. Hawkins, topographer.

The line starts from a point in the western part of the city of Toledo and follows the Lake Shore Railway to Edgerton, thence southwest via highways to the Indiana-Ohio State line, thence south along the State line to the Findlay, Fort Wayne and Western Railway, thence along that railway to Findlay, where it connects with a line run in 1900.

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Toledo, crossing of Michigan Central and Toledo, St. Louis and Western railroads.....	41 37 33.5	83 34 23.2
Mileposts 4 and 5, north and south road crossing between.....	41 38 01.4	83 36 23.6
Mileposts 5 and 6, north and south road crossing between.....	41 37 50.4	83 37 32.6
Mileposts 6 and 7, north and south road crossing between.....	41 37 39.3	83 38 42.4
Mileposts 7 and 8, north and south road crossing between.....	41 37 28.2	83 39 52.0
Milepost 8, $\frac{1}{4}$ mile east of, east and west road crossing.....	41 37 24.7	83 40 13.4
Mileposts 8 and 9, north and south road crossing between.....	41 37 17.0	83 41 01.8
Holland, north and south road crossing east of.....	41 37 05.9	83 42 11.3
Holland station.....	41 37 00.8	83 42 43.2
Holland, road crossing west of.....	41 37 00.2	83 42 47.1
Mileposts 11 and 12, north and south road crossing between.....	41 36 46.3	83 44 14.0
Milepost 12, east and west road crossing west of....	41 36 35.3	83 45 22.6
Mileposts 12 and 13, north and south road crossing between.....	41 36 32.4	83 45 40.3
Mileposts 13 and 14, east and west road crossing between.....	41 36 24.2	83 46 31.4
Mileposts 14 and 15, east and west road crossing between.....	41 36 11.7	83 47 49.6

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Mileposts 16 and 17, north and south road crossing between.....	41	35	55.9	83	49	27.6
Mileposts 17 and 18, north and south road crossing between.....	41	35	44.4	83	50	39.1
Mileposts 18 and 19, north and south road crossing between.....	41	35	33.3	83	51	47.7
Mileposts 18 and 19, north and south road crossing between.....	41	35	22.3	83	52	55.9
Swanton station.....	41	35	18.1	83	53	22.0
Swanton, main street crossing.....	41	35	17.5	83	53	25.9
Mileposts 20 and 21, north and south road crossing between.....	41	35	11.0	83	54	05.6
Mileposts 20 and 21, north and south road crossing between.....	41	35	03.3	83	54	53.5
Mileposts 21 and 22, north and south road crossing between.....	41	34	59.7	83	55	15.6
Mileposts 22 and 23, north and south road crossing between.....	41	34	48.2	83	56	26.9
Mileposts 23 and 24, north and south road crossing between.....	41	34	31.3	83	58	11.0
Mileposts 24 and 25, east and west road crossing between.....	41	34	25.2	83	58	48.3
Delta station.....	41	34	14.8	83	59	52.9
Delta, road crossing west of.....	41	34	14.5	83	59	54.8
Delta, road crossing west of.....	41	34	13.4	84	00	01.7
Delta, road crossing west of.....	41	34	11.7	84	00	11.9
Road crossing, northeast and southwest.....	41	34	01.8	84	01	13.0
Mileposts 27 and 28, north and south road crossing between.....	41	33	51.8	84	02	41.4
Mileposts 28 and 29, north and south road crossing between.....	41	33	40.6	84	03	23.5
Mileposts 29 and 30, north and south road crossing between.....	41	33	29.2	84	04	33.6
Mileposts 31 and 32, north and south road crossing between.....	41	33	06.6	84	06	52.6
Mileposts 32 and 33, north and south road crossing between.....	41	32	55.1	84	08	02.9
Wauseon, main street crossing.....	41	32	51.1	84	08	27.3
Wauseon station.....	41	32	49.7	84	08	35.9
Wauseon, crossing Lake Shore and Detroit Southern railroads.....	41	32	47.2	84	08	51.7
Wauseon Cemetery, north and south road crossing at.....	41	32	44.0	84	09	11.2
Milepost 34, east and west road crossing at.....	41	32	37.5	84	09	50.9
Mileposts 34 and 35, north and south road crossing between.....	41	32	32.7	84	10	20.5

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Mileposts 35 and 36, north and south road crossing between.....	41	32	21.4	84	11	29.9
Mileposts 36 and 37, north and south road crossing between.....	41	32	10.0	84	12	39.4
Mileposts 37 and 38, north and south road crossing between.....	41	31	59.3	84	13	44.7
Mileposts 38 and 39, north and south road crossing between.....	41	31	48.0	84	14	53.7
Mileposts 38 and 39, east and west road crossing between.....	41	31	42.7	84	15	26.3
Mileposts 39 and 40, north and south road crossing between.....	41	31	36.7	84	16	02.7
Mileposts 40 and 41, north and south road crossing between.....	41	31	25.3	84	17	12.0
Archbold station.....	41	31	15.3	84	18	12.7
Archbold, main street crossing.....	41	31	13.8	84	18	21.7
Mileposts 42 and 43, north and south road crossing between.....	41	31	02.4	84	19	31.1
Mileposts 43 and 44, north and south road crossing between.....	41	30	52.7	84	20	30.2
Milepost 45, north and south road crossing near.....	41	30	35.5	84	22	14.4
Mileposts 45 and 46, north and south road crossing between.....	41	30	27.2	84	23	04.7
Mileposts 46 and 47, north and south road crossing between.....	41	30	18.3	84	23	58.8
Stryker, main street crossing.....	41	30	09.8	84	24	50.5
Stryker station.....	41	30	08.4	84	24	58.8
Milepost 48, north and south road crossing near.....	41	30	02.7	84	25	33.1
Mileposts 48 and 49, north and south road crossing between.....	41	29	57.5	84	26	04.8
Milepost 49, north and south road crossing near.....	41	29	49.8	84	26	51.5
Mileposts 49 and 50, north and south road crossing between.....	41	29	43.2	84	27	31.2
Mileposts 50 and 51, north and south road crossing between.....	41	29	32.1	84	28	38.3
Mileposts 51 and 52, north and south road crossing between.....	41	29	20.6	84	29	47.9
Milepost 52, road crossing near.....	41	29	14.1	84	30	26.6
Milepost 53, road crossing near.....	41	29	06.3	84	31	14.2
Road crossing, northeast and northwest.....	41	29	01.2	84	31	44.6
Mileposts 53 and 54, north and south road crossing between.....	41	28	57.1	84	32	09.7
Lake Shore and Cincinnati Northern Railroad crossing	41	28	53.5	84	32	31.5
Bryan, road crossing at.....	41	28	49.2	84	32	57.4
Bryan, road crossing at.....	41	28	48.4	84	33	01.9

Geographic positions along Lake Shore and Michigan Southern Railway, between Toledo and Edgerton—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Bryan station.....	41	28	48.0	84	33	04.3
Road crossing over railroad.....	41	28	35.3	84	34	21.0
Mileposts 56 and 57, north and south road crossing between.....	41	28	23.0	84	35	35.2
Road crossing over railroad.....	41	28	11.3	84	36	45.4
Milepost 59, north and south road crossing near.....	41	27	59.9	84	37	54.5
Mulberry station.....	41	27	48.9	84	39	00.7
Milepost 60 north and south road crossing near.....	41	27	48.6	84	39	02.6
Road crossing over railroad.....	41	27	36.6	84	40	14.4
Milepost 62, north and south road crossing near.....	41	27	24.7	84	41	26.5
Mileposts 62 and 63, north and south road crossing between.....	41	27	20.6	84	41	51.5
Milepost 63, north and south road crossing near.....	41	27	13.0	84	42	37.2
Milepost 64, north and south road crossing near.....	41	27	01.8	84	43	45.3
Edgerton, road crossing at.....	41	26	53.9	84	44	32.7
Edgerton station.....	41	26	52.4	84	44	42.1
Edgerton, main street crossing.....	41	26	50.8	84	44	51.5

Geographic positions along highways between Edgerton and Ohio-Indiana State line.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 5 N., R. 1 E., corner secs. 3 and 4, on township line..	41	25	23.8	84	44	54.7
T. 5 N., R. 1 E., corner secs. 3, 4, 9, and 10.....	41	24	40.7	84	44	54.2
T. 5 N., R. 1 E., corner secs. 9, 10, 15, and 16.....	41	23	48.7	84	44	53.3
T. 5 N., R. 1 E., corner secs. 15, 16, 21, and 22.....	41	22	56.4	84	44	52.5
T. 5 N., R. 1 E., corner secs. 21, 22, 27, and 28.....	41	22	04.2	84	44	51.6
T. 5 N., R. 1 E., corner secs. 28, 29, 32, and 33.....	41	21	12.1	84	44	59.2
T. 5 N., R. 1 E., corner secs. 29, 30, 31, and 32.....	41	21	11.8	84	47	08.8

Geographic positions along Ohio-Indiana State line.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 5 N., R. 1 E., corner on State line between secs. 30 and 31.....	41	21	12.0	84	48	12.5
T. 4 N., R. 1 E., corner secs. 6 and 7.....	41	19	28.7	84	48	12.3
Road west.....	41	18	51.2	84	48	12.1
Baltimore & Ohio Railroad crossing.....	41	18	13.6	84	48	11.7
Roads west and southeast	41	17	59.0	84	48	11.7

Geographic positions along Ohio-Indiana State line—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road west.....	41 17 06.4	84 48 11.3
Road northeast and southwest.....	41 16 14.6	84 48 10.9
Road west.....	41 15 22.0	84 48 10.8
Ts. 3 and 4 N., R. 1 E., township corner.....	41 15 08.2	84 48 10.8
Road west.....	41 14 29.5	84 48 10.7
Road west.....	41 13 37.0	84 48 10.8
T. 3 N., R. 1 E., corner secs. 7 and 18.....	41 13 20.2	84 48 10.9
Road west.....	41 13 11.1	84 48 11.0
T. 3 N., R. 1 E., corner secs. 18 and 19.....	41 12 27.8	84 48 10.9
Road east and west.....	41 11 52.5	84 48 10.9
Road west.....	41 11 05.2	84 48 10.6
Road east.....	41 11 02.1	84 48 10.6
Road east.....	41 09 26.4	84 48 11.1
Wabash Railroad crossing.....	41 08 53.8	84 48 11.0
Road east.....	41 08 11.7	84 48 11.3
Road west.....	41 07 35.6	84 48 11.3
Road east.....	41 07 19.2	84 48 11.3
Road east.....	41 06 26.8	84 48 11.1
Road east.....	41 06 00.5	84 48 11.1
Road west.....	41 05 50.8	84 48 11.1
Ts. 1 and 2 N., R. 1 E., township corner.....	41 04 41.7	84 48 11.1
Road east and west.....	41 04 41.1	84 48 11.1
Road west.....	41 04 06.1	84 48 11.0
T. 1 N., R. 1 E., corner secs. 6 and 7.....	41 03 46.7	84 48 10.9
Road west.....	41 03 13.3	84 48 10.8
T. 1 N., R. 1 E., corner secs. 7 and 18.....	41 02 54.4	84 48 10.6
Road northeast.....	41 02 22.7	84 48 10.8
Road east.....	41 02 01.6	84 48 10.7
Road west.....	41 01 41.8	84 48 10.8
T. 1 N., R. 1 E., corner secs. 19 and 30.....	41 01 09.2	84 48 11.0

Geographic positions along Findlay, Fort Wayne and Western Railway, between Baldwin and Findlay.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Baldwin station.....	41 01 05.9	84 48 09.5
Road crossing, north and south.....	41 01 06.0	84 47 01.4
Road crossing, north and south.....	41 01 06.0	85 46 27.1
McGill station.....	41 01 06.0	84 46 26.2
Road crossing, north and south.....	41 01 06.1	84 45 35.8
Batson station.....	41 01 06.3	84 44 44.7
Road crossing, north and south.....	41 01 06.4	84 43 35.3

Geographic positions along Findlay, Fort Wayne and Western Railway, Etc.—
Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road crossing, north and south.....	41	01	06.6	84	42	26.0
T. 1 N., Rs. 1 and 2 E., corner secs. 19, 30, 24, and 25	41	01	09.2	84	41	16.2
Tipton, road crossing at.....	41	01	07.1	84	40	08.7
Road crossing, north and south.....	41	01	07.3	84	38	58.4
Road crossing, north and south.....	41	01	07.5	84	37	49.5
Road crossing, north and south.....	41	01	07.7	84	36	40.6
Road crossing, north and south.....	41	01	07.8	84	36	05.9
Road crossing, north and south.....	41	01	07.9	84	35	31.1
Haviland, railroad crossing at.....	41	01	08.0	84	34	56.0
T. 1 N., Rs. 2 and 3 E., corner secs. 19, 30, 24, 25, ..	41	01	10.0	84	34	21.6
Road crossing, north and south.....	41	01	08.2	84	33	12.1
Road crossing, north and south.....	41	01	08.4	84	32	02.9
Road crossing, north and south.....	41	01	08.6	84	30	53.4
Road crossing, north and south.....	41	01	08.9	84	29	44.4
Groverhill station.....	41	01	09.2	84	28	39.0
Groverhill, main street crossing.....	41	01	09.2	84	28	35.1
T. 1 N., Rs. 3 and 4 E., corner secs. 19, 30, 24, 25, ..	41	01	10.7	84	27	26.0
Road crossing, north and south.....	41	01	10.1	84	25	42.5
Roselmo station.....	41	01	10.3	84	25	07.4
Road crossing, north and south.....	41	01	10.7	84	24	58.9
Road crossing, north and south.....	41	01	10.9	84	23	24.6
Road south.....	41	01	11.1	84	22	50.1
Erie Canal crossing.....	41	01	11.6	84	21	31.5
T. 1 N., Rs. 4 and 5 E., corner secs. 19, 30, 24, 25, ..	41	01	12.7	84	20	31.7
Road crossing, north and south.....	41	01	12.4	84	19	22.0
Road crossing, north and south.....	41	01	12.6	84	18	47.0
Cloverleaf Railroad crossing.....	41	01	12.9	84	18	12.7
Road crossing, north and south.....	41	01	13.1	84	17	38.3
Road crossing, northwest and southeast.....	41	01	13.2	84	17	24.6
Road crossing, under railway.....	41	01	13.2	84	17	15.1
Road crossing, north and south.....	41	01	13.7	84	15	54.6
Road crossing, north and south.....	41	01	13.9	84	15	20.0
Road crossing, north and south.....	41	01	14.1	84	14	45.4
Rs. 5 and 6 E., road crossing between.....	41	01	14.5	84	13	36.3
Detroit and Lima Northern Railway crossing.....	41	01	14.7	84	12	59.0
Criswell station.....	41	01	15.0	84	11	58.1
Road crossing, north and south.....	41	01	15.0	84	11	52.7
Road crossing, north and south.....	41	01	15.4	84	10	18.0
Avis, road crossing at.....	41	01	15.4	84	10	09.7
Road crossing, north and south.....	41	01	15.7	84	08	59.7
Road crossing, north and south.....	41	01	15.8	84	08	25.8
Road crossing, north and south.....	41	01	15.8	84	08	07.9
Rs. 6 and 7 E., road crossing between.....	41	01	16.4	84	06	41.2

Geographic positions along Findlay, Fort Wayne and Western Railway, Etc.—
Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road crossing, north and south.....	41	01	16.8	84	05	32.3
Road crossing, north and south.....	41	01	17.0	84	04	57.5
Road crossing, north and south.....	41	01	17.1	84	04	42.1
Glandorf, road crossing at.....	41	01	17.2	84	04	23.4
Glandorf, road crossing $\frac{1}{2}$ mile east of.....	41	01	17.4	84	03	48.0
Ottawa, Cincinnati, Hamilton and Dayton Railway crossing.....	41	01	17.7	84	02	51.0
Ottawa station (Findlay, Fort Wayne and Western Railway).....	41	01	17.7	84	02	49.0
Road crossing, north and south.....	41	01	17.8	84	02	39.4
Detroit Southern Railroad crossing.....	41	01	17.9	84	02	04.4
Rs. 7 and 8 E., road crossing between.....	41	01	18.2	83	59	45.3
Pike road crossing.....	41	01	18.2	83	58	47.0
Road crossing, north and south.....	41	01	18.8	83	57	27.1
Road crossing.....	41	01	19.1	83	55	26.1
Gilboa station.....	41	01	19.1	83	55	19.6
Road crossing, north and south.....	41	01	19.1	83	55	19.2
Road crossing, north and south.....	41	01	19.1	83	55	08.9
Road crossing, north and south.....	41	01	19.2	83	54	16.6
Road crossing, north and south.....	41	01	19.3	83	53	59.4
Pike road crossing, northeast and southwest.....	41	01	19.4	83	53	11.0
Road, north and south.....	41	01	19.5	83	52	50.5
Road crossing, north and south.....	41	01	19.7	83	51	41.4
Moffits, road crossing at.....	41	01	19.8	83	50	49.2
Road crossing, north and south.....	41	01	20.2	83	48	49.2
Benton Ridge, road crossing at.....	41	01	20.4	83	47	57.0
Benton Ridge, road crossing $\frac{3}{4}$ mile east of.....	41	01	20.5	83	47	08.0
Rs. 9 and 10 E., road crossing between.....	41	01	20.7	83	45	55.7
Road, north and south.....	41	01	20.8	83	45	04.8
Pike road crossing, northeast and southwest.....	41	01	20.8	83	44	19.6
Road crossing, north and south.....	41	01	20.7	83	44	13.1
Road crossing, north and south.....	41	01	20.7	83	43	39.1
Road crossing, north and south.....	41	01	20.5	83	42	46.5
Road crossing, north and south.....	41	01	20.4	83	41	54.3
Lake Erie and Western Railroad crossing.....	41	01	20.4	83	41	00.2
Road crossing, north and south.....	41	01	20.4	83	40	45.2
Road crossing, northeast and southwest.....	41	01	20.5	83	40	05.4
Findlay, Main street crossing.....	41	01	20.5	83	39	01.6
Findlay station.....	41	01	20.5	83	38	59.5

The following geographic positions were determined from primary traverse run in 1901 by Mr. J. R. Ellis, field assistant:

Geographic positions along highways from Mount Sterling, Madison County, north to McCutchenville, Wyandot County.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mount Sterling, Baltimore and Ohio Railroad and main street crossing.....	39 43 17.6	83 16 03.7
Roads, north, east and south.....	39 45 11.9	83 15 11.1
Loubert Creek, bridge over.....	39 47 09.3	83 14 53.1
Wrightsville and Kiousville Pike, 300 feet east of W. McNeff's house.....	39 48 58.2	83 16 26.2
Wrightsville, cross roads at.....	39 51 39.3	83 14 52.2
Lilly Chapel and Georgesville, and road north.....	39 53 13.0	83 15 06.1
Lilly Chapel, Georgesville and West Jefferson cross roads.....	39 55 51.3	83 16 54.4
National Pike, cross roads on.....	39 56 45.4	83 15 14.0
Road east.....	39 58 24.9	83 15 36.0
Schoolhouse, road southwest at.....	39 59 53.5	83 15 50.9
Worthington store, road east at.....	40 02 30.5	83 15 49.9
Road east.....	40 04 08.1	83 15 05.6
Road east, north, and south.....	40 05 27.3	83 15 23.4
Pittsburg, Cincinnati, Chicago and St. Louis Railway, crossing of.....	40 05 43.2	83 14 54.0
Madison and Union counties, stone monument between.....	40 06 29.8	83 14 01.3
Fork of road northwest.....	40 09 50.2	83 13 44.1
Schoolhouse No. 9, road west near.....	40 11 26.2	83 14 32.3
Watkins, cross road in east part of.....	40 12 45.5	83 14 41.0
Road east, west, and north.....	40 13 53.0	83 14 46.1
Road north, south, east, and west.....	40 15 02.0	83 14 54.5
Road north, south, east, and west.....	40 16 56.0	83 15 02.0
Road north, west, and south.....	40 18 00.7	83 15 07.2
Delaware and Union counties, stone monument between.....	40 20 01.0	83 14 59.6
Roads east, west, and north.....	40 21 02.9	83 14 19.2
Roads east, west, and north near schoolhouse.....	40 21 53.5	83 13 51.0
Road north, east, and south.....	40 22 54.5	83 14 58.9
State road, northeast and southwest.....	40 23 46.7	83 16 07.9
Hoskins and State road crossing.....	40 25 08.6	83 14 57.0
Richwood and Prospect pike.....	40 26 10.7	83 15 32.1
East and west pike.....	40 27 47.0	83 15 04.0
Woodland, 570 feet southwest of, crossing Big Four Railway.....	40 28 45.3	83 15 27.4
Pike crossing, east and west.....	40 29 37.0	83 15 35.6
Road crossing, east and west.....	40 30 46.4	83 15 22.2
Road east, north and south.....	40 31 47.2	83 15 56.0
Do.....	40 33 04.0	83 16 07.6

Geographic positions along highways from Mount Sterling, Madison County, to McCutchenville, Wyandot County.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road, northwest and southeast.....	40	33	20.3	83	15	20.0
Gurley, 1 mile east of, Big Four Railway crossing....	40	35	09.5	83	15	21.2
Espyville, road crossing southeast and west at.....	40	35	52.5	83	15	20.4
T. 5 S., R. 14 E., $\frac{1}{4}$ corner between secs. 15 and 16..	40	36	28.8	83	14	47.0
T. 5 S., R. 14 E., corner secs. 3, 4, 9 and 10.....	40	37	47.1	83	14	46.1
Ts. 4 and 5 S., R. 14 E., $\frac{1}{4}$ corner between secs. 3 and 34.....	40	38	39.3	83	14	11.1
Pike road crossing, northeast and southwest.....	40	38	54.7	83	13	13.4
Schoolhouse, road crossing east and west, near.....	40	40	23.9	83	13	55.7
Crossing, east and west road with Harpster and Marion road.....	40	42	08.4	83	14	53.1
Roads, northeast and southwest.....	40	46	28.5	83	14	28.6
Quarter corner sections (no number).....	40	47	21.6	83	13	03.3
T. 3 S., R. 14 E., corner secs. 2, 3, 10 and 11.....	40	48	13.8	83	13	38.9
Ts. 2 and 3 S., R. 14 E., corner secs. 3, 4, 32, 33....	40	49	06.2	83	14	47.2
T. 2 S., R. 14 E., $\frac{1}{4}$ corner between secs. 28 and 33..	40	49	58.4	83	15	22.5
T. 2 S., R. 14 E., $\frac{1}{4}$ corner between secs. 16 and 21..	40	51	42.9	83	15	23.2
Roads east, west, north, and south.....	40	52	35.4	83	15	04.2
Roads east, west, and northeast.....	40	54	02.0	83	14	47.4
Roads north, west, and south.....	40	54	32.3	83	15	24.6
Sandusky River, bridge over.....	40	55	41.8	83	14	44.7
T. 1 S., R. 14 E., corner secs. 15, 16, 21 and 22.....	40	56	57.9	83	14	49.5
T. 1 S., R. 14 E., corner secs. 9, 10, 15 and 16.....	40	57	49.9	83	14	49.8
McCutchenville, crossing main street and Perrysburg road.....	40	59	26.6	83	15	36.6
McCutchenville, north part of, Ohio Central Railway crossing.....	41	00	08.0	83	15	43.1

Geographic positions along highways from near Bettsville, Seneca County, south to latitude $41^{\circ} 00'$, thence west to longitude $83^{\circ} 45'$, thence north to Maumee River, thence east to Dowling, Wood County.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Station 50 on Oak Harbor line.....	41	16	02.6	83	14	06.8
Bettsville crossing, Pennsylvania Railroad at.....	41	14	41.3	83	14	13.2
Crossroads at section corner.....	41	13	58.9	83	14	42.4
T. 3 N., R. 14 E., corner secs. 15, 16, 21 and 22.....	41	12	36.7	83	14	41.0
T. 3 N., R. 14 E., corner secs. 27, 28, 33 and 34.....	41	10	51.7	83	14	46.2
Ts. 2 and 3 N., R. 14 E., corner secs. 3, 4, 33 and 34...	41	09	59.6	83	14	49.4
T. 2 N., R. 14 E., corner secs. 9, 10, 15 and 16.....	41	08	17.0	83	14	50.6
T. 2 N., R. 14 E., corner secs. 15, 16, 21 and 22.....	41	07	24.4	83	14	50.4

Geographic positions along highways from near Bettsville, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 2 N., R. 14 E., corner secs. 27, 28, 33 and 34.....	41 05 39.5	83 14 51.6
Ts. 1 and 2 N., R. 14 E., corner secs. 3, 4, 33 and 34....	41 04 47.5	83 14 51.6
Roads north, south, east, and west.....	41 02 36.8	83 14 51.0
T. 1 N., R. 14 E., $\frac{1}{4}$ corner between secs. 16 and 21..	41 01 44.6	83 15 43.3
T. 1 N., R. 14 E., $\frac{1}{4}$ corner between secs. 28 and 33....	41 00 26.3	83 15 43.5
T. 1 N., Rs. 13 and 14 E., $\frac{1}{4}$ corner between secs. 31 and 36.....	40 59 59.8	83 18 18.6
T. 1 N. and 1 S., R. 13 E., corner secs. 3, 4, 33 and 34..	40 59 32.3	83 21 47.1
T. 1 N. and 1 S., Rs. 12 and 13 E., corner secs. 1, 6, and 31, and 36.....	40 59 30.9	83 25 13.9
Road northeast and southwest.....	40 59 28.1	83 27 29.1
Vanlue, crossing Big Four Railway, in northwest part of.....	40 58 32.6	83 29 03.4
Schoolhouse, crossroads at.....	40 58 31.8	83 30 46.2
Roads east, west, and north.....	40 58 53.9	83 33 53.2
Roads northeast and southwest.....	40 58 57.4	83 36 47.1
Ts. 1 N. and 1 S., Rs. 10 and 11 E., corner between....	40 59 35.5	83 39 02.2
Ts. 1 N. and 1 S., R. 10 E., corner secs. 1, 2, 35 and 36.	40 59 35.7	83 40 11.1
Ts. 1 N. and 1 S., R. 10 E., $\frac{1}{4}$ corner between secs. 3 and 34.....	40 59 36.0	83 41 54.6
Lake Erie and Western Railroad crossing.....	41 00 45.2	83 41 54.5
T. 1 N., R. 10 E., $\frac{1}{4}$ corner between secs. 15 and 16. . .	41 02 38.5	83 42 29.2
T. 1 N., R. 10 E., $\frac{1}{4}$ corner between secs. 9 and 10. . .	41 03 30.9	83 42 29.4
Cincinnati, Hamilton and Dayton Railway crossing..	41 04 59.2	83 43 36.9
T. 2 N., R. 10 E., corner secs. 28, 29, 32 and 33.....	41 05 42.6	83 43 37.1
T. 2 N., R. 10 E., corner secs. 16, 17, 20 and 21.....	41 07 26.8	83 43 37.9
Road northeast and southwest.....	41 09 34.5	83 43 38.3
T. 3 N., R. 10 E., corner secs. 28, 29, 32 and 33.....	41 10 58.1	83 43 36.9
T. 3 N., R. 10 E., corner secs. 20, 21 28 and 29.....	41 11 50.1	83 43 37.8
T. 3 N., R. 10 E., corner secs. 16, 17, 20 and 21.....	41 12 42.2	83 43 38.1
T. 3 N., R. 10 E., corner secs. 4, 5, 8 and 9.....	41 14 26.6	83 43 38.5
T. 4 N., R. 10 E., corner secs. 28, 29, 32 and 33.....	41 16 09.8	83 43 40.0
T. 4 N., R. 10 E., corner secs. 20, 21, 28 and 29.....	41 17 02.0	83 43 40.3
T. 4 N., R. 10 E., corner secs. 4, 5, 8 and 9.....	41 19 38.8	83 43 41.4
Ts. 4 and 5 N., R. 10 E., corner secs. 4, 5, 32 and 33.	41 20 34.4	83 43 42.3
T. 5 N., R. 10 E., corner secs. 20, 21, 28 and 29.....	41 22 18.9	83 43 41.8
T. 5 N., R. 10 E., $\frac{1}{4}$ corner between secs. 8 and 17..	41 24 03.8	83 44 16.7
Ts. 5 and 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 5 and 32.....	41 25 48.2	83 44 16.9
T. 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 29 and 32..	41 26 40.1	83 44 17.8
T. 6 N., R. 10 E., $\frac{1}{4}$ corner between secs. 17 and 20....	41 28 25.2	83 44 17.9
T. 6 N., R. 10 E., corner secs. 14, 15, 26 and 27.....	41 28 24.0	83 41 23.3
T. 6 N., R. 10 E., corner secs. 13, 14, 23 and 24.....	41 28 23.9	83 40 13.8

Geographic positions along highways from Vanlue, Hancock County, south to Pfeiffer, on Erie R. R., thence west to $83^{\circ} 45'$, thence north to southwest corner of Findlay quadrangle.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Vanlue, Big Four Railway crossing in northwest part of.....	40	58	32.6	83	29	03.5
T. 1 S., R. 12 E., $\frac{1}{4}$ corner between secs. 16 and 21..	40	56	53.5	83	29	10.5
T. 1 S., R. 12 E., $\frac{1}{4}$ corner between secs. 28 and 33..	40	55	09.2	83	29	10.3
T. 2 S., R. 12 E., $\frac{1}{4}$ corner between secs. 4 and 9....	40	53	24.7	83	29	10.7
Roads northeast and southwest.....	40	51	51.5	83	29	30.6
$\frac{1}{4}$ corner secs.....	40	50	49.0	83	30	23.2
Big Four Railway crossing near milepost 70.....	40	49	06.4	83	30	08.1
Road crossing northeast and southwest.....	40	47	09.0	83	29	49.4
T. 3 S., R. 12 E., corner secs. 28, 29, 32 and 33.....	40	44	41.7	83	29	48.7
T. 4 S., R. 12 E., corner secs. 8, 9, 16 and 17.....	40	42	04.8	83	29	45.7
T. 4 S., R. 12 E., corner secs. 20, 21, 28 and 29.....	40	40	19.4	83	29	45.1
Ts. 4 and 5 S., R. 12 E., corner secs. 4, 5, 32 and 33....	40	38	34.0	83	29	46.3
Roads north, east, and west.....	40	37	24.1	83	30	57.4
Henpeck schoolhouse, road crossing at.....	40	38	04.5	83	33	09.0
Corner secs.....	40	38	39.2	83	34	34.0
Kenton, 1.5 miles west of, crossing of Big Four Rwy...	40	38	48.3	83	38	20.6
Kenton, 4.5 miles west of, crossing of Big Four Rwy...	40	39	30.7	83	40	30.2
Big Four Railway and north and south road crossing..	40	40	09.6	83	42	28.9
T. 3 S., R. 10 E., corner secs. 5, 6, 31 and 32.....	40	43	57.2	83	44	52.6
T. 3 S., R. 10 E., corner secs. 19, 20, 29 and 30.....	40	45	42.4	83	44	52.2
T. 3 S., R. 10 E., corner secs. 7, 8, 17 and 18.....	40	47	26.6	83	44	51.7
Ts. 2 and 3 S., R. 10 E., $\frac{1}{4}$ corner between secs. 5 and 32.....	40	49	08.9	83	44	16.5
T. 2 S., R. 10 E., corner secs. 19, 20, 29 and 30.....	40	50	53.5	83	44	48.9
T. 2 S., R. 10 E., corner secs. 7, 8, 17 and 18.....	40	52	38.5	83	44	48.2
Ts. 1 and 2 S., R. 10 E., corner secs. 5, 6, 31 and 32....	40	54	25.5	83	44	47.7
T. 1 S., R. 10 E., corner secs. 19, 20, 29 and 30.....	40	56	10.3	83	44	47.6
T. 1 S., R. 10 E., corner secs. 7, 8, 17 and 18.....	40	57	55.2	83	44	48.4
T. 1 S., R. 10 E., corner secs. 5, 6, 7 and 8.....	40	58	47.7	83	44	48.0

Geographic positions along highways from a position near southwest corner of the Findlay quadrangle west to meridian $84^{\circ} 00'$, thence north to Ohio-Michigan boundary line, thence west to longitude $84^{\circ} 15'$, thence south to Erie Railroad, thence southeast along railroad to Foraker.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Findlay, about 5 miles southwest of, Lake Erie and Western Railroad crossing.....	40	58	54.1	83	44	47.9
Ts. 1 N. and 1 S., Rs. 9 and 10 E., corner secs. 1, 6, 31 and 36.....	40	59	36.5	83	45	56.3

Geographic positions along highways from a position near southwest corner of the Findlay quadrangle, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ts. 1 N. and 1 S., R. 9 E., corner secs. 3, 4, 33 and 34...	40 59 35.9	83 49 23.1
Ts. 1 N. and 1 S., R. 9 E., corner secs. 5, 6, 31 and 32...	40 59 35.4	83 51 41.3
Ts. 1 N. and 1 S., R. 8 E., corner secs. 1, 2, 35 and 36...	40 59 35.1	83 53 59.1
Ts. 1 N. and 1 S., R. 8 E., corner secs. 3, 4, 33 and 34...	40 59 34.7	83 56 17.5
Ts. 1 N. and 1 S., R. 8 E., corner secs. 5, 6, 31 and 32...	40 59 34.0	83 58 36.2
T. 1 N., Rs. 7 and 8 E., corner secs. 7, 18, 13 and 12...	41 03 02.2	83 59 45.5
T. 2 N., Rs. 7 and 8 E., corner secs. 25, 30, 31 and 36...	41 05 40.1	83 59 46.5
T. 2 N., Rs. 7 and 8 E., corner secs. 18, 19, 24 and 13...	41 07 24.8	83 59 47.5
T. 2 N., Rs. 7 and 8 E., corner secs. 1, 6, 7 and 12...	41 09 09.5	83 59 48.0
T. 3 N., Rs. 7 and 8 E., corner secs. 25, 30, 31 and 36...	41 10 53.0	83 59 49.0
T. 3 N., Rs. 7 and 8 E., corner secs. 18, 19, 24 and 13...	41 12 37.6	83 59 50.2
T. 3 N., Rs. 7 and 8 E., corner secs. 1, 6, 7, and 12...	41 14 22.2	83 59 51.2
Ts. 3 and 4 N., Rs. 7 and 8 E., corner secs. 1, 6, 31 and 36...	41 15 15.1	83 59 52.1
T. 4 N., Rs. 7 and 8 E., corner secs. 19, 30, 24 and 25...	41 16 59.4	83 59 54.0
T. 4 N., R. 7 E., corner secs. 7, 18, 13 and 12...	41 18 44.4	83 59 56.0
Ts. 4 and 5 N., R. 7 E., corner secs. 1, 6, 31 and 36...	41 20 30.1	83 59 58.2
Ts. 4 and 5 N., R. 7 E., corner secs. 1, 6, 31 and 36...	41 20 30.1	83 59 58.2
T. 5 N., Rs. 7 and 8 E., corner secs. 19, 30, 24 and 25...	41 22 14.9	83 59 57.7
T. 5 N., R. 7 E., corner secs. 7, 18, 13 and 12...	41 23 59.3	83 59 57.0
Iron bridge over creek, southeast, center of...	41 25 59.1	83 59 56.0
T. 6 N., Rs. 7 and 8 E., corner secs. 19, 30, 24 and 25...	41 27 26.9	83 59 55.6
T. 6 N., R. 7 E., corner secs. 7, 18, 13 and 12...	41 29 11.3	83 59 55.2
Ts. 6 and 7 N., R. 7 E., $\frac{1}{4}$ corner between secs. 1 and 36...	41 30 55.6	84 00 30.1
Ts. 7 and 8 N., Rs. 7 and 8 E., corner secs. 1, 6, 31 and 36...	41 36 10.0	83 59 54.1
Ts. 9 and 10 S., Rs. 3 and 4 E., corner secs. 1, 6, 31 and 36...	41 38 30.9	83 59 45.2
T. 9 S., Rs. 3 and 4 E., corner secs. 24, 19, 30 and 25...	41 40 13.8	83 59 48.6
T. 9 S., R. 3 E., corner secs. 7, 18, 13 and 12...	41 41 57.2	83 59 52.5
T. 9 S., R. 3 E., corner secs. 1, 6, 7 and 12...	41 42 49.8	83 59 54.0
T. 9 S., R. 3 E., corner secs. 2, 3, 10 and 11...	41 42 50.3	84 02 13.2
T. 9 S., R. 3 E., corner secs. 5, 6, 7 and 8...	41 42 47.3	84 05 43.1
Ohio-Michigan State line...	41 42 46.4	84 07 10.1
Schoolhouse, road crossing at...	41 42 14.7	84 08 37.0
T. 9 S., R. 2 E., corner secs. 3, 4, 9 and 10, on State line...	41 42 30.3	84 10 21.9
T. 9 S., R. 2 E., corner secs. 8, 9, 16 and 17...	41 41 48.4	84 11 30.4
T. 9 S., Rs. 1 and 2 E., corner secs. 7, 18, 13 and 12...	41 41 47.2	84 13 48.7
T. 9 S., R. 1 E., corner secs. 13, 14, 23 and 24...	41 40 54.3	84 14 55.6
T. 9 S., R. 1 E., corner secs. 25, 26, 35 and 36...	41 39 08.9	84 14 54.3
T. 10 S., R. 1 E., corner secs. 1, 2, 11 and 12...	41 37 24.0	84 14 52.0
T. 7 N., R. 5 E., corner secs. 1, 2, 11 and 12...	41 35 12.2	84 14 56.0

Geographic positions along highways from a position near southwest corner of the Findlay quadrangle, etc.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 7 N., R. 5 E., corner secs. 13, 14, 23 and 24.....	41	33	27.7	84	14	55.5
T. 6 N., R. 5 E., corner secs. 1, 2, 11 and 12.....	41	30	00.5	84	14	53.6
T. 6 N., R. 5 E., corner secs. 13, 14, 23 and 24.....	41	28	16.1	84	14	52.8
Ridgeville corners, crossroads at.....	41	26	15.8	84	15	26.0
T. 5 N., R. 5 E., corner secs. 1, 2, 11 and 12.....	41	24	46.9	84	14	50.7
T. 5 N., R. 5 E., corner secs. 13, 14, 23 and 24.....	41	23	02.3	84	14	49.3
T. 5 N., R. 5 E., corner secs. 25, 26, 35 and 36.....	41	21	17.6	84	14	48.0
T. 4 N., R. 5 E., corner secs. 1, 2, 11 and 12.....	41	19	32.5	84	14	48.0
T. 4 N., R. 5 E., corner secs. 13, 14, 23 and 24.....	41	17	48.2	84	14	48.0
T. 4 N., R. 5 E., corner secs. 25, 26, 35 and 36.....	41	16	03.8	84	14	47.9
Ts. 3 and 4 N., R. 5 E., corner secs. 1, 2, 35 and 36....	41	15	11.5	84	14	47.8
T. 3 N., R. 5 E., corner secs. 11, 12, 13 and 14.....	41	13	26.1	84	14	48.6
T. 3 N., R. 5 E., corner secs. 23, 24, 25 and 26.....	41	11	41.7	84	14	49.8
Ts. 2 and 3 N., R. 5 E., corner secs. 1, 2, 35 and 36....	41	09	57.3	84	14	50.2
T. 2 N., R. 5 E., corner secs. 11, 12, 13 and 14.....	41	08	13.0	84	14	49.7
T. 2 N., R. 5 E., corner secs. 23, 24, 25 and 26.....	41	06	23.1	84	14	48.4
Ts. 1 and 2 N., R. 5 E., corner secs. 1, 2, 35 and 36....	41	04	43.4	84	14	47.2
T. 1 N., Rs. 5 and 6 E., corner secs. 1, 6, 7 and 12.....	41	03	52.0	84	13	37.7
T. 1 N., Rs. 5 and 6 E., corner secs. 25, 30, 31 and 36....	41	00	22.3	84	13	35.9
T. 1 S., Rs. 5 and 6 E., corner secs. 1, 6, 7 and 12.....	40	58	37.0	84	13	34.3
T. 1 S., R. 5 E., corner secs. 11, 12, 13 and 14.....	40	57	42.6	84	14	39.7
T. 1 S., R. 5 E., corner secs. 23, 24, 25 and 26.....	40	55	58.8	84	14	39.5
Ts. 1 and 2 S., R. 5 E., corner secs. 1, 2, 35 and 36....	40	54	14.5	84	14	38.1
T. 2 S., R. 5 E., corner secs. 13, 14, 23 and 24.....	40	51	35.6	84	14	37.5
T. 2 S., R. 5 E., corner secs. 25, 26, 35 and 36.....	40	49	51.9	84	14	37.2
T. 3 S., R. 5 E., corner secs. 1, 2, 11 and 12.....	40	48	07.8	84	14	36.3
T. 3 S., R. 5 E., corner secs. 13, 14, 23 and 24.....	40	46	23.6	84	14	35.0
T. 3 S., R. 5 E., corner secs. 25, 26, 35 and 36.....	40	44	38.5	84	14	33.3
Ts. 3 and 4 S., R. 5 E., corner secs. 1, 2, 35 and 36.....	40	43	46.1	84	14	32.8

Geographic positions along Erie Railroad from Kemp to Foraker.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Kemp station (Kempton postoffice)	40	43	25.6	84	13	27.6
Road crossing, northeast and southwest.....	40	43	33.9	84	09	19.0
Lima station.....	40	43	26.4	84	06	21.9
Ohio Southern Railroad crossing.....	40	43	26.5	84	05	10.5
T. 4 S., R. 7 E., corner secs. 3, 4, 9 and 10.....	40	43	00.7	84	03	06.3
T. 4 S., Rs. 7 and 8 E., corner secs. 1, 6, 7 and 12.....	40	42	59.7	83	59	38.7
Westminster station.....	40	42	57.2	83	59	35.3

Geographic positions along Erie Railroad from Kemp to Foraker—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Harrod station.....	40	42	33.9	83	55	15.9
Algers station.....	40	42	19.1	83	50	37.6
T. 4 S., R. 9 E., corner secs. 8, 7, 16 and 17.....	40	42	14.1	83	50	31.5
McGuffey station.....	40	41	40.1	83	47	05.3
Foraker station.....	40	40	46.6	83	44	21.8

Geographic positions for control of Westerville quadrangle.

Station	Latitude.			Longitude.		
	°	'	"	°	'	"
Columbus, Mock road crossing.....	40	00	54.0	82	59	47.9
Road northeast and southwest (electric railway)....	40	00	49.5	82	58	03.2
Cleveland, Akron and Columbus Railway crossing, (azimuth of railway 194° 09').....	40	00	49.1	82	57	54.3
Road north and south.....	40	00	47.7	82	57	24.1
Alum Creek, south end of bridge.....	40	00	34.7	82	56	06.5
Road north and south.....	40	01	13.3	82	54	41.5
Road north and south.....	40	01	08.7	82	53	03.1
Gahanna, center of bridge over Big Walnut River....	40	01	08.3	82	52	48.7
T. 1, Rs. 16 and 17, secs. 1, 2, 3, 4, corner of road north and south.....	40	01	06.2	82	52	00.1
District No. 11, schoolhouse.....	40	02	33.8	82	50	39.4
T. 1, R. 16, corner secs. 2, 1, 4, 3.....	40	03	07.4	82	49	08.0
Havens Corner, crossroads.....				82	48	54.3
Road north and south, at schoolhouse.....	40	03	02.0	82	47	23.4
Franklin-Licking county line, road north.....	40	01	02.9	82	46	13.4
Squire Swishers, road north and south.....	40	00	56.6	82	45	00.6
Road east and west.....	40	01	01.4	82	44	51.9
Road east and west.....	40	01	09.6	82	44	51.1
Intersection, road north and road east and west, south of schoolhouse.....	40	00	56.6	82	45	20.8
Bridge.....	40	03	40.2	82	45	18.0
Beech, crossroads.....	40	04	46.2	82	45	13.3
Road east and west.....	40	05	50.6	82	45	14.6
Bridge over branch running west.....	40	06	34.0	82	45	11.6
Intersection of road north and Johnstown road northeast and southwest.....	40	07	27.6	82	45	07.5
Licking, Franklin and Delaware counties, corner of; also corner Ts. 2 and 3, Rs. 15 and 16, secs. 2, 3, 4, 1.	40	07	33.8	82	45	43.0
Road west at schoolhouse.....	40	08	19.9	82	45	39.6
Road east and west and southeast.....	40	09	22.6	82	45	34.8
Road east.....	40	10	17.9	82	45	30.8
Road north near Clem Blamer's house north.....	40	10	14.4	82	44	18.6

Geographic positions for control of Westerville quadrangle.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road northwest and southeast.....	40	10	45.2	82	44	16.2
Road east and west.....	40	12	27.1	82	44	24.4
Wm. Feasels, crossroads.....	40	13	56.8	82	44	17.7
Delaware-Licking county line, road north and south..	40	13	59.0	82	45	15.3
Road north.....	40	13	57.7	82	47	24.1
South conduit, crossroads.....	40	14	52.9	82	47	20.4
Road north.....	40	14	44.8	82	49	48.5
Cleveland, Akron and Columbus crossing (azimuth of railway 253° 00')	40	14	47.4	82	50	42.3
Big Walnut Creek, center of bridge.....	40	14	48.6	82	50	59.3
Sunbury, Harrison street and Mt. Vernon road, at Dr. Vankirk's.....	40	14	42.3	82	51	14.5
Road northwest and southeast.....	40	14	44.4	82	51	53.6
Road west to Rome.....	40	15	01.5	82	52	18.6
T. 4, R. 17, secs. 1, 2, 3, 4, corner of.....	40	14	46.2	82	53	40.0
Rome, intersection of roads at guidepost.....	40	14	48.1	82	54	38.7
Johnny Cake schoolhouse, road north and south.....	40	14	17.0	82	56	22.7
Cheshire, road north.....	40	14	19.9	82	57	41.0
Cheshire, Whitman's store.....	40	14	20.1	82	57	45.3
Cheshire, 1 mile west of, station on Green Spring and Columbus line.....	40	14	22.4	82	58	45.8
District No. 7, schoolhouse, road south.....	40	14	24.9	83	00	22.7
Big Four Railway crossing (azimuth 176° 56').....	40	14	26.0	83	00	46.2
Columbus-Delaware road.....	40	14	31.9	83	03	05.7
Intersection of roads north and south and west (about 800 feet below bridge over Olentangy River).....	40	15	10.4	83	03	46.7
T. 4, R. 19, secs. 1, 2, 3, 4, corner of, road north and south.....	40	15	12.1	83	04	56.4
Hocking Valley Railway road crossing, 340 feet south of milepost 103.....	40	15	12.6	83	05	08.5

Geographic positions for control of Mount Sterling quadrangle.

Station	Latitude.			Longitude.		
	°	'	"	°	'	"
Mount Sterling, Main street crossing Baltimore and Ohio Railroad (Hawkins traverse, 1900).....	39	43	17.6	83	16	03.7
Mount Sterling, road southwest to Washington Court-House.....	39	42	59.3	83	16	06.2
Fayette-Madison county line.....	39	41	47.3	83	16	16.4
Jones schoolhouse, No. 5, center of road.....	39	40	51.0	83	16	16.6
Old Yankeetown, east and west road.....	39	39	41.1	83	16	05.8
Schoolhouse No. 2, road.....	39	38	50.6	83	16	16.3

Geographic positions for control of Mount Sterling quadrangle—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	"	'	"
Waterloo, in front of Methodist church.....	39	37	24.7	83	15	55.5
Fayette-Pickaway county line, stone monument.....	39	37	01.4	83	15	31.0
Road north and south.....	39	36	09.4	83	16	04.9
Bridge near Chauncey Dicks.....	39	35	29.9	83	15	56.0
Pike, northwest and southeast.....	39	34	08.0	83	16	13.5
Pickaway and Fayette counties, road on line of.....	39	33	32.8	83	15	46.9
New Holland, Main street crossing Cincinnati and Muskingum Valley Railroad.....	39	33	15.8	83	15	26.2
Road southwest.....	39	31	31.2	83	14	43.9
Ross-Pickaway county line.....	39	30	55.6	83	14	56.7
Schoolhouse No. 9, intersection of roads.....	39	30	15.2	83	15	03.4
Brick schoolhouse, District No. 10, crossroads.....	39	28	53.5	83	14	45.9
Plano postoffice.....	39	29	27.2	83	17	07.2
Fairview, road crossing Cincinnati, Hamilton and Dayton Railway (azimuth 282° 58').....	39	28	48.5	83	18	15.6
Fairview church, road north.....	39	28	42.1	83	19	19.8
Road north and south.....	39	28	49.6	83	20	14.1
Pleasant Grove, southwest corner schoolhouse yard, road north.....	39	30	02.2	83	21	36.6
Blacksmith shop, road north and south.....	39	30	32.8	83	22	39.8
Bridge over drain south.....	39	30	50.6	83	23	57.1
Washington Court-House, north end of bridge over Middle Fork Paint Creek, 1 mile south of.....	39	31	04.4	83	25	01.5
Ohio Southern Railway crossing near trestle, 480 feet southeast of milepost 102.....	39	30	55.1	83	25	06.5
Washington Court-House, crossroads on Greenfield pike, 2 miles south of.....	39	30	34.2	83	26	28.8
Leesburg pike, north and south.....	39	30	16.3	83	28	22.3
Snow Hill pike, Ingles schoolhouse, 20 feet north....	39	30	19.6	83	29	43.1
Jasper Mills, Baltimore and Ohio Railroad crossing, $\frac{3}{4}$ mile east of (azimuth 253° 36').....	39	31	19.1	83	30	27.0
Sugar Creek church, intersection of Palmer pike, east and west and road north, about 300 feet west of.....	39	32	54.1	83	30	27.5
Johnstown schoolhouse.....	39	33	59.5	83	30	19.6
Township line, stone post.....	39	34	26.5	83	30	46.4
Luray siding Cincinnati, Hamilton and Dayton Rail- way, east switch block.....	39	34	36.3	83	30	51.6
Hagler, Ohio Southern Railroad crossing.....	39	35	16.8	83	30	55.7
Washington-Jefferson pike, northwest and southeast	39	35	41.1	83	30	46.2
Blackoak schoolhouse, platform in front of.....	39	36	08.6	83	30	29.8
Paint Creek, west end of bridge over.....	39	37	10.1	83	29	17.2
McDill's blacksmith shop, road east and west.....	39	38	58.3	83	30	01.1
Paint Creek, center of bridge over.....	39	39	35.3	83	30	16.7
Paint Creek, south end of iron bridge over.....	39	39	49.9	83	30	17.2

Geographic positions for control of Mount Sterling quadrangle—Continued.

Station.	Latitude.			Longitude		
	°	'	"	°	'	"
Pike, west, at small bridge.....	39	40	31.3	83	30	15.7
Maple Grove schoolhouse.....	39	41	47.6	83	30	15.2
Fayette-Madison County, stone monument.....	39	42	29.9	83	30	10.1
Hayes schoolhouse, road east and west.....	39	42	51.4	83	29	52.4
Sedalia, Ohio Southern Railroad crossing, $\frac{3}{4}$ mile southwest of.....	39'	43	28.7	83	29	17.4
Sedalia, South Solon pike, east and west.....	39	44	01.4	83	29	06.5
Sedalia, intersection Main street and road east and west.....	39	44	00.5	83	28	36.7
Bridge over creek northeast.....	39	43	55.9	83	25	45.2
Range, London pike northwest.....	39	43	55.5	83	25	31.7
Bethel, M. E. Church, crossroads at.....	39	43	48.8	83	23	37.4
Bridge over branch south.....	39	43	52.0	83	22	16.6
Chenoweth, road north.....	39	43	51.6	83	21	25.1
Sugar Run bridge.....	39	43	49.7	83	19	53.9
Road south at schoolhouse.....	39	43	48.8	83	19	11.5
Mount Sterling, London pike, $\frac{1}{2}$ mile north of.....	39	43	48.7	83	16	17.2
Stokes-Range township monument.....	39	44	02.8	83	30	07.8
Sedalia, 2 miles west of, center of South Solon pike, in front of Jim Chapman's gate.....	39	43	59.8	83	31	02.3

Geographic positions between Green Spring and Columbus, along or near the eighty-third meridian.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 3 N., R. 16 E., corner secs. 3, 2, 11, and 10.....	41	14	29.4	82	59	40.2
T. 3 N., R. 16 E., corner secs. 10, 11, 14, and 15, road east and west.....	41	13	37.0	82	59	40.6
T. 3 N., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west.....	41	12	44.7	82	59	41.4
T. 3 N., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west, schoolhouse.....	41	11	51.4	82	59	42.2
T. 3 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west.....	41	10	59.4	82	59	43.4
Ts. 2 and 3 N., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west (jogs east 50 feet, then turns south).....	41	10	08.1	82	59	46.4
T. 2 N., R. 16 E., corner secs. 3, 2, 11, and 10.....	41	09	12.8	82	59	44.9
T. 2 N., R. 16 E., corner secs. 10, 11, 14, and 15.....	41	08	20.4	82	59	45.5
T. 2 N., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west.....	41	07	28.2	82	59	45.6
T. 2 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west.....	41	05	43.5	82	59	45.6
Ts. 1 and 2 N., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west.....	41	04	51.3	82	59	45.6

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 1 N., R. 16 E., corner secs. 3, 2, 11, and 10, road east.....	41	03	57.9	82	59	45.9
T. 1 N., R. 16 E., corner secs. 10, 11, 14, and 15, pike east.....	41	03	05.5	82	59	46.5
Bloomville, Pennsylvania Railroad crossing, 290 feet east of switch block (azimuth of railway 308° 55')...	41	02	40.8	82	59	56.6
T. 1 N., R. 16 E., corner secs. 15, 14, 23, and 22, roads east and west and northwest.....	41	02	13.3	82	59	46.8
T. 1 N., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west.....	41	01	21.1	82	59	48.2
T. 1 N., R. 16 E., corner secs. 27, 26, 35, and 34, road east and west.....	41	00	28.9	82	59	47.8
Ts. 1 N. and 1 S., R. 16 E., corner secs. 34, 35, 2, and 3 road east and west.....	40	59	36.2	82	59	49.6
T. 1 S., R. 16 E., corner secs. 3, 2, 11, and 10, road east and west.....	40	58	45.3	82	59	49.7
T. 1 S., R. 16 E., corner secs. 10, 11, 14, and 15, road east and west.....	40	57	52.9	82	59	49.7
Northern Ohio Railway and road crossing (azimuth west 89° 50').....	40	57	26.5	82	59	49.9
T. 1 S., R. 16 E., corner secs. 14, 15, 23, and 22, road east and west.....	40	57	00.2	82	59	49.9
T. 1 S., R., 16 E., corner secs. 22, 23, 26, and 27, road east and west.....	40	56	07.9	82	59	50.0
T. 1 S., R. 16 E., corner secs. 27, 26, 35, 34, road east and west.....	40	55	15.5	82	59	50.4
Ts. 1 and 2 S., R. 16 E., corner secs. 34, 35, 2, and 3, road east and west.....	40	54	23.4	82	59	50.8
Broken Sword, cross roads at Ts. 1 and 2 S., R. 16 E., corner secs. 33, 34, 3, and 4.....	40	54	23.3	83	00	59.4
T. 2 S., R. 16 E., corner secs. 3, 4, 10, and 9, road east and west.....	40	53	30.4	83	00	59.9
T. 2 S., R. 16 E., corner secs. 9, 10, 15, and 16, road east and west.....	40	52	38.2	83	00	59.9
T. 2 S., R. 16 E., corner secs. 16, 15, 22, and 21, road east and west, schoolhouse.....	40	51	46.1	83	00	59.8
Ohio Central Railway, at road crossing (azimuth 126° 32').....	40	50	49.8	83	00	59.5
Ts. 2 and 3 S., R. 16 E., corner secs. 33, 34, 3, and 4..	40	49	08.5	83	00	59.4
Bucyrus; Pennsylvania Railroad crossing, 2 miles west of (azimuth 273° 52').....	40	48	41.4	83	01	03.2
T. 3 S.; R. 16 E., corner secs. 4, 3, 10, and 9, road east and west.....	40	48	16.3	83	01	02.5
Northeast and southwest pike road and road south...	40	47	38.8	82	59	53.4
Marion City, road northeast and southwest.....	40	46	38.5	82	59	52.7
Columbus, Sandusky & Hocking Railroad crossing (azimuth 34° 22').....	40	46	31.7	82	59	14.9
Road east and west.....	40	44	47.4	82	59	29.9

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Ts. 3 and 4 S., R. 16 E., corner secs. 34, 35, 2, and 3, road west.....	40	43	55.0	82	59	42.5
Road east and west.....	40	43	03.9	82	59	59.4
Crawford and Marion county line, road east and west..	40	42	11.1	83	00	15.6
Kirkpatrick, road east and west.....	40	41	18.9	83	00	30.7
T. 4 S., R. 16 E., corner secs. 21, 22, 28, and 27, road east and west.....	40	40	26.3	83	00	53.0
Road east and west.....	40	39	07.4	83	01	08.7
Erie Railroad crossing (azimuth 248° 04').....	40	37	05.3	83	01	44.8
T. 5 S., R. 16 E., $\frac{1}{4}$ corner between secs. 15 and 10..	40	36	56.8	83	00	18.4
T. 5 S., R. 16 E., corner secs. 15, 14, 23, and 22.....	40	36	04.6	82	59	44.1
T. 5 S., R. 16 E., corner secs. 22, 23, 26, and 27, road northeast, due east of.....	40	35	12.2	82	59	48.5
Road east and west.....	40	33	43.1	82	59	44.9
T. 6 S., R. 16 E., corner secs. 3, 2, 11, and 10.....	40	32	34.0	82	59	44.1
T. 6 S., R. 16 E., corner secs. 10, 11, 14, and 15, road east and west.....	40	31	42.0	82	59	44.2
T. 6 S., R. 16 E., corner secs. 15, 14, 23, and 22, road east and west.....	49	30	48.9	82	59	43.8
T. 6 S., R. 16 E., corner secs. 22, 23, 26, and 27, road east and west (church).....	40	29	56.0	82	59	44.2
Road east and west.....	40	29	29.7	82	59	44.6
Marion-Morrow county line.....	40	29	08.1	83	00	25.9
Corner lots 15, 14, 20, and 21 road east and west....	40	28	20.1	83	00	27.9
T. 7 N., R. 18 W., corner lots 21, 22, 20, and 19, cross-roads.....	40	27	21.6	83	00	32.0
T. 7 N., R. 18 W., corner lots 12, 9, 8, and 13, road north and south.....	40	27	18.2	82	59	21.7
Westfield, $\frac{1}{4}$ mile west of, center of bridge over Whetstone River.....	40	25	56.8	82	59	13.2
T. 6 N., R. 18 W., corner lots 13, 8, 7, and 14 pike east and west, schoolhouse	40	24	43.0	83	00	04.2
Crossroads corner lots 15 (turn east).....	40	23	49.9	83	00	10.6
Schoolhouse (turn south).....	40	23	48.8	82	59	40.7
Leonardsburg, 840 feet northeast of Big Four station.	40	21	34.5	82	59	14.5
Leonardsburg, 1 mile southwest of, road crossing....	40	20	39.4	82	59	50.3
Road northeast and southwest.....	40	19	58.3	82	59	53.5
Corner lots 19, 12, 11, and 20.....	40	19	53.7	82	59	53.5
Big Four Railway crossing.....	40	19	53.6	83	00	33.0
T. 5 N., R. 18 W., sec. 3, lots 22 and 23, (Edin-Delaware Pike northeast and southwest).....	40	18	32.7	83	00	37.8
Pike east and west, where old railroad crosses.....	40	17	46.6	83	00	59.2
On pike running southeast and northwest, road south	40	17	17.7	83	00	57.2
Road east and west.....	40	16	08.1	83	00	02.2
Road west to Berlin station.....	40	15	16.6	82	59	35.1
T. 4 N., R. 18 W., secs. 2, 1, 4, 3, ...	40	14	58.2	82	59	11.9
Cheshire, 1 mile west of, State road north and south..	40	14	22.4	82	58	45.9

Geographic positions between Green Spring and Columbus, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road east and west.....	40 12 59.2	82 59 04.8
Road east and west.....	40 11 54.2	82 59 24.0
T. 3 N., R. 18 W., corner secs. 2, 1, 4, 3, ...	40 10 26.2	82 59 31.8
Road east and west.....	40 09 26.0	82 59 42.3
Road east.....	40 08 44.7	82 59 58.4
Delaware-Franklin county line, road east.....	40 08 10.2	83 00 16.4
Crossing under Big Four Railway, turn south on rail- way.....	40 08 07.6	83 00 19.0
Flint, road crossing 210 feet north of station.....	40 07 38.3	83 00 16.9
Road crossing.....	40 06 33.3	83 00 12.3
Worthington, $\frac{3}{4}$ mile south of, junction Columbus, Sandusky and Hocking Valley and Big Four rail- ways.....	40 05 10.9	83 00 06.4
Road crossing.....	40 03 42.0	83 00 00.0
Road crossing.....	40 01 58.6	82 59 52.6
Mock road crossing, east and west.....	40 00 54.1	82 59 47.9
Columbus, intersection North Fourth street and Wy- andotte avenue.....	40 00 36.3	82 59 53.4
Columbus, intersection North High street and West Lane avenue.....	40 00 21.9	83 00 33.8

Geographic positions along highways from Oak Harbor west to about meridian $83^{\circ} 15'$, thence south following near said meridian to about parallel $41^{\circ} 15'$ thence east following near said parallel to a point nearly south of the United States Lake Survey triangulation station Townsend.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Oak Harbor station, 700 feet east of, crossing north and south.....	41 31 11.8	83 08 44.4
T. 6 N., R. 14 E., corner secs. 15, 16, 21 and 22, road east and west.....	$\left. \begin{array}{l} 21 00 00.0 \\ 41 28 21.1 \end{array} \right\}$	$\left. \begin{array}{l} 83 14 28.4 \end{array} \right\}$
Road east and west.....	41 27 54.9	83 14 28.0
Road east.....	41 26 37.0	83 14 26.5
Lake Shore Railway (azimuth $314^{\circ} 41' 20''$).....	41 25 58.1	83 14 25.8
T. 5 N., R. 14 E., corner secs. 3, 4, 9, and 10, road east..	41 24 49.5	83 14 26.4
Hessville, crossing electric railway in southeast part	41 24 03.5	83 14 32.6
Road east and west.....	41 22 13.4	83 13 23.8
T. 5 N., R. 14 E., corner secs. 26, 27, 34, and 35 road east and west.....	41 21 21.2	83.13 25.7
Ts. 4 and 5 N., R. 14 E., corner secs. 2, 3, 34, and 25..	41 20 29.1	83 13 27.9
Corner secs. 2, 3, 10, and 11, road east and west.....	41 19 33.0	83 13 32.7
Road east and west.....	41 16 55.3	83 14 07.6
Lake Erie and Western Railroad (azimuth $48^{\circ} 50'$)..	41 16 37.3	83 14 07.3

Geographic positions along highways from Oak Harbor, etc.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Roads north, east, south, and west.....	41	16	02.6	83	14	06.8
Road southwest.....	41	16	05.6	83	12	21.8
Road northeast.....	41	16	17.2	83	12	08.6
Road north, south, east, and west.....	41	15	43.4	83	11	16.4
Road north and south.....	41	15	45.1	83	10	04.8
T. 4 N., R. 15 E. center section 33.....	41	15	47.7	83	08	26.4
T. 4 N., R. 15 E., $\frac{1}{4}$ corner between secs. 33 and 34..	41	15	48.7	83	07	52.5
Ts. 3 and 4 N., R. 15 E., corner secs. 3, 4, 33, and 34 .	41	15	22.1	83	07	53.9
Ts. 3 and 4 N., R. 15 E. corner secs. 2, 3, 34, and 35, road north.....	41	15	22.9	83	06	44.3
Ts. 3 and 4 N., R. 15 E., corner secs. 1, 2, 35, and 36, road north and south.....	41	15	23.5	83	05	31.4
Ts. 3 and 4 N., Rs. 15 and 16 E., corner secs. 1, 6, 31, and 36, road north.....	41	15	23.7	83	04	21.9
Ts. 3 and 4 N., R. 16 E., corner secs. 5, 6, 31, and 32..	41	15	23.3	83	03	15.6
Green Spring, crossing main street.....	41	15	23.2	83	03	07.4
Big Four Railway crossing (azimuth 27° 28').....	41	15	22.8	83	02	52.5
Ts. 3 and 4 N., R. 16 E., corner secs. 3, 4, 33, and 34..	41	15	20.2	83	00	49.1
New York, Chicago and St. Louis Railroad crossing..	41	15	20.1	83	00	46.8
Ts. 3 and 4 N., R. 16 E., corner secs. 2, 3, 34, and 35, road south.....	41	15	20.2	82	59	39.5
Ts. 3 and 4 N., R. 16 E., corner secs. 1, 2, 25, and 36 road north and south.....	41	15	20.4	82	58	30.6
Ts. 3 and 4 N., R. 16 and 17 E., corner secs. 1, 6, 31, and 36, road north and south.....	41	15	20.2	82	57	21.1
Ts. 3 and 4 N., R. 17 E., corner secs. 5, 6, 31, and 32, road north and south.....	41	15	20.0	82	56	11.4
Ts. 3 and 4 N., R. 17 E., corner secs. 4, 5, 32, and 34, road north and south.....	41	15	19.6	82	55	02.1
Ts. 3 and 4 N., R. 17 E., corner secs. 3, 4, 33, and 34, road north and south.....	41	15	19.2	82	52	52.2
Road northeast and southwest.....	41	15	18.7	82	52	19.1
Road north and south.....	41	15	18.5	82	51	32.5
Hocking Valley Railway (azimuth 207° 25').....	41	15	18.3	82	50	48.6
Road north and south.....	41	14	49.8	82	48	09.2
Lake Shore Railway (azimuth 307° 31').....	41	15	34.5	82	46	58.4
Road north and south.....	41	15	34.6	82	45	50.9
Road northwest.....	41	15	21.8	82	44	43.4
Monroeville, north part of Baltimore and Ohio Rail- road crossing.....	41	15	02.5	82	41	52.2
Road northeast and southwest.....	41	15	00.8	82	41	04.0
Road north and south.....	41	14	59.5	82	39	55.2
Norwalk, corner Whittsey and Washington streets....	41	14	58.7	82	37	12.6
Norwalk, junction Lake Erie and Lake Shore rail- ways.....	41	14	52.4	82	36	09.6

Geographic positions along highways from Oak Harbor, etc.—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 3 N., R. 22 E., corner secs. 1, 2, 3, and 4.....	41 14 58.9	82 35 25.8
Road north and south.....	41 14 58.0	82 33 57.6
Road north and south.....	41 14 56.7	82 31 58.0
Road north and south.....	41 14 53.5	82 29 30.8
Townsend, United States Lake Survey triangulation station.....	41 15 43.5	82 29 00.6

Geographic positions from Townsend triangulation station eastward along or near parallel 41° 15' to meridian 82° 15', thence northward to Brownhelm triangulation station of the United States Lake Survey.

Station.	Latitude.	Longitude
	° ' "	° ' "
Road north and south.....	41 14 51.6	82 28 01.8
T. 4 N., Rs. 20 and 21 W., corner secs. 1, 2, 3, and 4..	41 14 50.7	82 26 32.6
Wakeman, road north through center of.....	41 14 51.0	82 24 08.4
T. 4 N., R. 20 W., corner secs. 1, 2, 3, and 4.....	41 14 51.5	82 23 31.1
Road north and south.....	41 14 16 8	82 21 40.8
Road north.....	41 14 16.5	82 20 50.5
Road north.....	41 14 15.7	82 19 56.3
T. 4, R. 19, lots 29, 28, 4, and 5, corner between sub-districts 3 and 4.....	41 14 15.3	82 18 16.2
Road north and south.....	41 14 15.3	82 17 22.8
T. 4 N., Rs. 18 and 19, corner between subdistricts 3 and 4.....	41 14 14.7	82 16 06.9
Road north and south.....	41 14 14.1	82 15 23.1
T. 4, R. 18, T. lots 75, 76, 85, and 86, Center Pittsfield.....	41 14 13.4	82 13 07.1
Crossing electric railway, run north on railway.....	41 14 13.4	82 13 06.8
Road east and west.....	41 15 55.6	82 13 03.0
Crossing Lake Shore Railway.....	41 16 53.1	82 14 12.6
Road east and west.....	41 17 40.6	82 14 19.0
T. 5, R. 18, corner lots 53, 54, 63, and 64, road east..	41 18 32.3	82 14 17.1
South Amherst, cross roads at.....	41 21 27.2	82 14 26.0
Crossing Lake Shore at stone quarry No. 6.....	41 22 09.7	82 15 11.0
Crossing Lake Shore at stone quarry No. 6.....	41 22 14.1	82 15 10.9
Cross roads.....	41 22 42.8	82 15 10.6
Shore Rice, in front of machine shop.....	41 22 46.3	82 15 26.9
T. 6, R. 19, corner lots 38, 39, 42, and 43, Brownhelm postoffice	41 23 20.9	82 16 58.1
Brownhelm, United States Lake Survey triangulation station.....	41 23 18.5	82 18 28.8

PRIMARY TRAVERSE.

The following geographic positions were determined from primary traverse run by J. R. Ellis in 1902. The line starts from Loveland, Baltimore and Ohio and Pennsylvania Railway crossing located by primary traverse in 1900 and follows the Pennsylvania Railway to Middletown Junction, thence along highways to Little Muddy Creek on Cincinnati, Lebanon and Northern Railway, following this road 3 miles, thence along highways to Red Lion, thence west through Blue Ball and Darton, west and south through Wood and Preston, thence south and east and connected with Madisonville station.

Geographic positions along the Pennsylvania Railroad between Loveland and Middletown Junction.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Loveland railroad crossing.....	39 16 00.6	84 15 31.9
Road crossing north and south.....	39 16 51.3	84 15 35.1
Road crossing under trestle.....	39 18 27.7	84 15 23.5
Foster, road crossing at.....	39 19 19.0	84 15 03.4
Road crossing north and south.....	39 21 05.1	84 14 27.8
Road crossing northeast and southwest.....	39 22 17.2	84 14 42.3

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Crossroads.....	39 23 30.0	84 14 52.9
Road crossing north and south.....	39 24 34.0	84 14 35.4
Road southeast.....	39 26 54.6	84 14 06.4
Bridge over creek south.....	39 28 06.1	84 14 16.2
Red Lion, T. 3 E., R. 4 N., center section 15.....	39 29 28.2	84 14 55.4
T. road south.....	39 29 31.1	84 16 23.7
T. road north.....	39 29 35.7	84 17 32.2
Crossroads.....	39 29 36.6	84 19 00.1
Blue Ball, crossroads at.....	39 29 37.4	84 20 09.6
T. road west.....	39 28 26.0	84 20 32.1
Middletown and Cincinnati Railroad at road crossing..	39 28 30.0	84 21 49.1
T. 3 E., R. 4 N., corner secs. 20, 26, 25, 19.....	39 28 34.5	84 23 44.8
Electric railway crossing.....	39 28 52.1	84 25 09.3
Trenton, crossing State street and Cincinnati, Hamilton and Dayton Railroad.....	39 28 52.6	84 27 09.9
Ts. 4 and 5 N., Rs. 3 and 4 E., corner of.....	39 28 51.0	84 28 35.8

Geographic positions along highways—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Ts. 4 and 5 N., R. 3 E., corner secs. 1, 2, 35, 36.....	39	28	49.8	84	29	43.5
Road crossing north and south.....	39	29	05.2	84	30	41.9
Road crossing north and south.....	39	29	30.9	84	31	58.7
T. 5 N., R. 3 E., corner secs. 28, 29, 32, 33, ...	39	29	40.2	84	33	06.7
Seven-mile station, crossing Pittsburgh, Cincinnati Chicago and St. Louis Railroad, 1 mile northwest of.....	39	29	39.3	84	34	15.6
Road crossing north and south.....	39	29	28.0	84	36	30.5
T. road north.....	39	29	37.6	84	38	13.8
T. 5 N., R. 3 E., corner secs. 27, 28, 33, 34, ...	39	29	37.7	84	38	46.7
Road north and south.....	39	29	34.7	84	40	49.8
T. 5 N., Rs. 1 and 2 E., T. road east near corner secs. 30, 25, 36, 31.....	39	29	36.6	84	41	47.2
Pike northwest and southeast.....	39	28	49.9	84	42	43.5
Wood, crossing of Cincinnati, Hamilton and Dayton Railroad, west of station.....	39	27	30.1	84	43	00.1
T. 4 N., R. 1 E., corner secs. 11, 12, 13, 14.....	39	26	59.2	84	43	17.9
T. 4 N., R. 1 E., corner secs. 13, 14, 23, 24.....	39	26	07.1	84	43	17.5
Road northwest and southeast.....	39	25	13.6	84	43	44.6
St. Charles T., road north at.....	39	23	30.6	84	44	30.3
T. 3 N., R. 1 E., corner secs. 2, 3, 10, 11.....	39	22	40.5	84	44	21.3
T. 3 N., R. 1 E., corner secs. 10, 11, 14, 15, ...	39	21	48.4	84	44	21.6
Crossing Cold Wail Pike.....	39	20	16.5	84	44	22.8
T. road south (gravel).....	39	19	00.8	84	43	50.4
Preston postoffice, west end of bridge, one-half mile east of.....	39	16	33.8	84	43	51.9
T. 2 N., R. 1 E., corner secs. 14, 15, 22, 23.....	39	15	41.8	84	44	25.2
T. 2 N., Rs. 1 and 2 E., corner secs. 7, 12, 13, 18....	39	16	33.9	84	42	11.4
Corner secs. , numbers not given.....	39	16	33.8	84	41	03.9
Sater postoffice, north end of iron bridge at	39	15	50.4	84	40	02.6
Sater postoffice, corner sec. 1 mile southeast of	39	15	11.6	84	39	33.9
Sater postoffice, corner sec. 1 mile southeast of	35	15	11.6	84	39	33.9
Barnburg tollgate, crossroads at.....	39	13	58.5	84	37	41.4
Crossroads.....	39	13	15.6	84	36	04.9
Grossbeck, crossroads at.....	39	13	13.0	84	35	09.6
T. 3 N., R. 1 E., corner secs. 26, 32, 31, 25.....	39	13	05.3	84	32	57.7
Carthage, crossing Fifth street and Cincinnati, Ham- ilton and Dayton Railroad.....	39	11	54.5	84	28	56.9
Madisonville station.....	39	09	26.0	84	23	49.0

PRIMARY TRAVERSE.

BETHANY AND HAMILTON QUADRANGLES.

Additional control for the Bethany and Hamilton quadrangles was obtained by J. R. Ellis, topographic aid, who ran a line via highways approximately on the meridian of $84^{\circ} 30'$ between Carthage and Trenton established by him in 1902.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Carthage, crossing of the Fifth street and Cincinnati, Hamilton and Dayton R. R.....	39 11 54.5	84 28 56.9
Hartwell, Clark avenue, east.....	39 13 18.9	84 28 22.6
Parkplace, Allen avenue, west.....	39 14 32.7	84 28 15.5
T. 3 N., R. 1 E., corner secs. 4, 5, 10, 11, Sullivan road east.....	39 15 28.9	84 28 09.7
Springdale, Banklick road east and west.....	39 17 13.8	84 29 04.9
Butler and Hamilton county line, road east.....	39 18 06.9	84 29 04.9
Jones crossing of road and Cincinnati, Hamilton and Dayton R. R.....	39 19 20.3	84 29 37.5
Flockton, crossing of road and Pennsylvania R. R....	39 21 08.7	84 29 25.6
Hamilton and Princeton pike, east and west.....	39 23 22.9	84 28 48.6
Flenner's Corners, road northeast and southwest....	39 24 58.1	84 28 29.9
Woodale, road intersection.....	39 25 58.4	84 28 31.5
Ts. 4 and 5 N., Rs. 3 and 4 E., corner of.....	39 28 51.0	84 28 35.8

PRIMARY TRAVERSE.

FRANKLIN, MADISON, CLARK, MONTGOMERY, DARKE, MERCER AND
VAN WERT COUNTIES.

(London, South Charleston, Springfield, Dayton, Trotwood, Eaton,
Greenville, St. Henry, Colina and Van Wert Quadrangles.)

The following geographic positions were determined from primary traverse in 1903 by Mr. George T. Hawkins, topographer. The line starts from the adjusted position of crossing of the Pennsylvania and Toledo and Ohio Railways about 5 miles northwest of Columbus, follows Toledo and Ohio Railways southeast to edge of Columbus, thence along Pennsylvania Railway to London, thence along Big Four Railway to Springfield, thence along the Erie and Big Four Railways to Dayton, thence along the Pennsylvania Railway and the Dayton and Union Railroad to Greenville, thence along Cincinnati Northern Railroad to Haviland and connected with line run in 1901.

This work was supplemented by 430 miles of primary traverse run by Mr. J. R. Ellis, topographic aid, along public highways, following the parallels and meridians as closely as possible. The lines being tied and adjusted to positions located by Mr. Hawkins' line.

Geographic positions along the Pennsylvania Railroad from a point 5 miles northwest of Columbus to London.

Station	Latitude.	Longitude.
	° ' "	° ' "
Ohio Central and Pennsylvania Railroad, northwest of Columbus, crossing of.....	40 00 04.5	83 05 57.4
Sullivan road crossing, .75 miles north of.....	39 57 58.9	83 04 38.8
Pike and telephone road crossing.....	39 57 55.1	83 05 43.5
Milepost 6, road crossing 400 feet west of.....	39 57 51.7	83 06 40.5
Milepost 8, road crossing 200 feet east of.....	39 57 44.3	83 08 47.3
Milepost 8 and 9, road crossing between.....	39 57 42.1	83 09 27.6
Alton, road crossing at.....	39 57 40.3	83 10 00.9
Pike and telephone road crossing northwest and south east.....	39 57 33.2	83 12 12.0
Overhead road crossing.....	39 57 27.5	83 13 57.3
Pike and telephone road crossing.....	39 57 16.8	83 15 16.6
West Jefferson Station, road crossing at.....	39 56 48.6	83 16 08.9
West Jefferson, National road crossing.....	39 56 40.3	83 16 23.9
Milepost 19, north and south road crossing 350 feet west of.....	39 55 06.5	83 20 34.5
Milepost 20, north and south road crossing 100 feet east of.....	39 54 49.1	83 21 31.0
Milepost 22, north and south road crossing .25 mile west of.....	39 54 01.7	83 23 48.4
London, crossing of "Big Four" Railway.....	39 53 04.7	83 26 33.5

Geographic positions along the "Big Four" Railway between London and Springfield.

Station.	Latitude.	Longitude.
	° ' "	° ' "
London, road crossing west of station.....	39 53 03.2	83 26 45.6
London, High street crossing.....	39 53 01.5	83 37 08.8
Gravel road crossing.....	39 53 16.4	83 30 01.0
Myers, road crossing .25 mile west of.....	39 53 25.3	83 31 45.3
Dirt road crossing.....	39 53 30.7	83 33 10.5
Gravel road and telephone road crossing.....	39 54 33.01	83 46 15.8
Detroit Southern Railway, crossing of.....	39 54 37.4	83 46 33.5
Springfield: Limestone street car line, crossing of....	39 55 20.2	83 48 31.0
Springfield National road crossing of.....	39 55 35.3	83 50 32.3
Overhead road crossing.....	39 55 10.1	83 51 41.6

Geographic positions along the Erie Railway between Durbin and Milepost 376.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Durbin, milepost 396.....	39	54	42.5	83	53	21.7
Snyderville road crossing.....	39	54	04.7	83	54	48.1
Enon road crossing.....	39	53	22.6	83	56	08.6
Mileposts 375 and 376, road crossing halfway between.....	39	51	53.1	83	59	38.6
Mileposts 376 and 377, road crossing one-half way between.....	39	51	28.1	84	00	37.9

Geographic positions along the "Big Four" Railway between Osborn and Dayton.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Osborn station, road crossing one mile north of.....	39	51	11.6	84	01	11.9
Osborn, road crossing north of station.....	39	50	39.2	84	01	58.8
Osborn, road crossing north and south.....	39	50	33.9	84	02	05.7
Gravel road and telephone road crossing.....	39	49	43.4	84	03	04.8
Simms, road crossing at.....	39	48	35.8	84	04	23.9
Pike and telephone road crossing east and west.....	39	47	12.9	86	06	42.6
Harshman, road crossing at.....	39	46	54.8	84	07	14.7
Street car trestle, road crossing at.....	39	46	41.2	84	08	22.9
Dayton, Third street car track crossing of.....	39	45	40.3	84	10	55.5
Dayton, First street car line east of station, crossing of.....	39	45	18.8	84	11	32.4

Geographic positions along the Pennsylvania Railway between Dayton and Dodson.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Dayton, Germantown street crossing of.....	39	45	04.1	84	12	24.0
Dayton, Third street car line crossing of.....	39	45	20.6	84	12	57.2
Wagon bridge, crossing at north end of.....	39	46	01.5	84	14	09.9
Road crossing north and south.....	39	46	26.7	84	15	12.5
Cincinnati, Hamilton and Dayton Railway, crossing of.....	39	46	44.2	84	15	55.9
Milepost 35, road crossing 300 feet west of.....	39	47	23.0	84	17	33.0
Trotwood, road crossing north and south at.....	39	47	50.1	84	18	40.6
Milepost 33, road crossing one-third mile west of.....	39	48	17.4	84	19	48.9
Mileposts 31 and 32, road crossing between.....	39	48	43.5	84	20	53.9
Airhill, road crossing north and south.....	39	49	10.5	84	22	01.0
Mileposts 29 and 30, road crossing north and south between.....	39	49	38.4	84	23	10.2
Brookville station, road crossing 200 feet west of.....	39	50	13.1	84	24	36.9
Milepost 27, road crossing north and south.....	39	50	33.6	84	25	28.4
Dodson, road crossing north and south.....	39	51	02.1	84	26	40.1

Geographic positions along the Dayton and Union Railroad between Bachman and Greenville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Bachman, crossing of National road.....	39 51 46.4	84 27 29.0
Wengerlawn, road crossing east and west.....	39 52 26.2	84 27 58.9
Wrights road crossing.....	39 53 20.4	84 28 40.0
Gillispee's road crossing, 30.....	39 53 55.1	84 29 06.0
West Baltimore, road crossing.....	39 54 12.6	84 29 19.0
Mileposts 20 and 21, north and south road crossing between.....	39 54 41.5	84 29 40.6
Gordon, street car line and road, crossing of.....	39 55 58.0	84 30 37.7
Milepost 23, east and west road crossing 1,000 feet north of.....	39 56 49.8	84 31 16.5
Mileposts 24 and 25, east and west road crossing be- tween.....	39 57 41.5	84 31 55.8

Geographic positions along the Dayton and Union Railroad between Bachman and Greenville.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Mileposts 25 and 26, east and west road crossing be- tween.....	39 58 33.6	84 32 35.2
Arcanum, crossing "Big Four" Railway.....	39 59 16.3	84 33 07.5
Arcanum, road crossing east and west.....	39 59 19.8	84 33 10.1
Iron Bridge, road crossing east and west.....	40 00 19.2	84 33 54.6
Mileposts 28 and 29, road crossing between.....	40 01 00.3	84 34 25.2
Delisle, road crossing at.....	40 01 10.9	84 34 33.0
Jaysville, road crossing east and west at.....	40 02 55.4	84 35 50.0
Mileposts 32 and 33, road crossing between.....	40 03 47.9	84 36 29.0
Mileposts 34 and 35, road crossing between.....	40 05 16.7	84 37 33.3

Geographic positions along the Cincinnati Northern Railroad between Greenville and Haviland.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Greenville, Dayton and Union and Pennsylvania Railways, crossing of.....	40 05 43.5	84 37 38.2
Greenville, crossing north of Dayton and Union sta- tion.....	40 05 58.8	84 37 40.0
Greenville, crossing of Dayton and Union Ry.....	40 06 30.1	84 38 23.3
Road crossing northwest and southeast.....	40 07 19.6	84 38 47.6
Road crossing east and west.....	40 08 10.2	84 38 47.8

Geographic positions along the Cincinnati Northern Railroad between Greenville and Haviland—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Road crossing east and west.....	40	09	02.8	84	38	48.0
Church, road crossing 500 feet west of Meekers, crossing Pennsylvania.....	40	09	55.6	84	38	47.9
Pennsylvania and Dayton and Union Railways at. . .	40	10	16.6	84	38	47.9
House, road crossing east and west, 200 feet south-east of.....	40	11	35.1	84	38	37.0
Road crossing east and west.....	40	12	27.9	84	38	24.9
Ansonia, crossing "Big Four" and Dayton and Union Railways at.....	40	12	43.4	84	38	24.9
Road crossing east and west.....	40	13	31.4	84	38	35.2
Bridge, east and west road crossing west of.....	40	15	02.5	84	38	34.7
Oak tree, east and west road crossing 150 feet south-west of.....	40	15	54.4	84	38	32.6
Rossville, east and west road crossing at.....	40	16	46.6	84	38	22.8
Road crossing, east and west.....	40	17	38.8	84	38	37.6
Trestle, road crossing under railway at south end of..	40	18	31.2	84	38	37.1
Road crossing east and west.....	40	19	23.7	84	38	36.6
New Weston, road crossing at.....	40	20	15.8	84	38	36.2
Guilbert, road crossing at.....	40	21	07.6	84	38	36.1
Road crossing east and west.....	40	21	59.8	84	38	36.1
Road crossing east and west.....	40	23	32.9	84	38	36.1
Road crossing east and west.....	40	24	25.3	84	38	36.1
St. Henry, road crossing at.....	40	25	05.0	84	38	36.1
Road crossing east and west.....	40	26	10.8	84	38	36.1
Baradees, road crossing at.....	40	27	03.3	84	38	36.0
Road crossing east and west.....	40	27	55.9	84	38	16.3
Coldwater, road crossing at.....	40	28	47.9	84	37	38.4
Blind siding, road crossing east and west, 200 feet south of.....	40	30	07.5	84	36	32.1
Pike, crossing east and west.....	40	31	39.5	84	35	05.5
Celina, main road crossing in southwest part of.....	40	32	46.0	84	34	35.8
Cemetery, road crossing east and west at.....	40	33	38.1	84	34	39.8
Road crossing east and west.....	40	34	30.6	84	35	09.5
Road crossing east and west.....	40	35	49.8	84	35	53.8
Schoolhouse, east and west road crossing .25 mile west of.....	40	36	42.3	84	36	23.7
Road crossing east and west.....	40	37	34.8	84	36	53.8
Tana, road crossing east and west at.....	40	38	01.0	84	37	08.9
Schoolhouse, road crossing 800 feet west of.....	40	39	19.3	84	37	52.7
Road crossing east and west.....	40	40	38.1	84	38	33.4
Rockford, road crossing at.....	40	41	27.2	84	38	43.6
Road crossing northeast and southwest.....	40	41	53.5	84	38	42.0
Road crossing north and south.....	40	42	54.3	84	38	16.7

Geographic positions along the Cincinnati Northern Railroad between Greenville and Haviland—Concluded.

Station.	Latitude.	Longitude.
	° "	° ' "
Schoolhouse, road crossing east and west .25 miles east of.....	40 44 33.3	84 37 34.0
Pipeline and road crossing east and west.....	40 45 25.9	84 37 11.3
Ohio City, Clover Leaf Ry., crossing of.....	40 46 13.2	84 36 51.9
Ohio City, crossing telephone line and street.....	40 46 18.6	84 36 49.7
Road crossing east and west.....	40 47 11.2	84 36 28.4
Road crossing east and west.....	40 48 03.6	84 36 07.0
Road crossing east and west 100 ft. west of pike....	40 49 22.3	84 35 27.1
Road crossing east and west.....	40 50 14.8	84 35 26.7
Van Wert, crossing of main road in southwest part of.	40 51 55.2	84 35 27.0
Van Wert, Pennsylvania Ry. crossing of.....	40 52 20.4	84 35 19.1
Road crossing east and west.....	40 54 11.2	84 34 53.2
Bridge, east and west road crossing 300 feet west of...	40 55 03.4	84 34 53.5
Bridge, east and west road crossing 400 feet west of...	40 56 21.9	84 34 54.1
Cavett Station, road crossing at.....	40 56 48.0	84 34 54.3
Road crossing east and west.....	40 57 40.4	84 34 54.7
Sawmill, east and west road crossing at.....	40 58 32.6	84 34 55.1
Scott, east and west road crossing at.....	40 59 25.0	84 34 55.3
East and west road crossing.....	41 00 17.5	84 34 55.4
Haviland, Findlay, Fort Wayne and Western and Cincinnati Northern Railways, crossing at.....	41 01 08.0	84 34 56.0

LONDON QUADRANGLE.

This line starts from an adjusted position four miles north of West Jefferson, follows public highways as near as possible along the north and west borders of the London Quadrangle connecting with adjusted position at Sedalia.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
West Jefferson, four miles north of T. road southwest at schoolhouse.....	39 59 53.5	83 15 50.9
T. road northeast.....	39 59 17.7	83 17 02.5
Cregor, schoolhouse, T. road southwest at.....	39 59 54.6	83 17 30.9
T. road northeast.....	39 58 50.4	83 19 39.3
Gillivan postoffice, crossroads at	39 59 19.0	83 20 13.4
Little Darby Creek center of bridge over.....	39 58 18.4	83 21 23.8
Urbana pike and pike northeast and southwest, crossing of.....	39 57 59.7	83 21 45.5
Deer Creek Jefferson and Monroe townships, stone monument between.....	39 58 15.3	83 22 15.4
Road north.....	39 58 29.6	83 22 42.0
Crossroads.....	39 58 46.6	83 23 32.0
Schoolhouse, crossroads... ..	39 59 35.6	83 25 14.3
Tradersville, crossroads two miles northeast of.....	40 01 02.8	83 27 56.6
Tradersville, intersection of roads one mile northeast of.....	40 00 24.2	83 28 52.2
Tradersville, crossroads at.....	40 00 00.7	83 29 54.9
Road northeast.....	39 59 14.8	83 29 52.1
Y.road southeast.....	39 37 17.3	83 30 20.5
Covered bridge, center of.....	39 56 45.5	83 30 09.2
Summerford, crossroads at.....	39 56 01.5	83 29 30.9
Summerford, T.road south half-mile west of.....	39 56 00.0	83 30 04.9
Tile, Factory private road west, at.....	39 54 59.5	83 30 27.3
T-road west.....	39 54 26.0	83 30 28.8
State Fishery, T.road north at.....	39 53 45.5	83 30 32.5
Big Four Railroad, gravel road crossing of, A. of R. R. 276° 21'.....	39 53 16.4	83 30 01.0
South Charleston and London pike, T.road north at..	39 52 10.6	83 29 40.9
Union and Paint townships, stone monument between.....	39 51 09.5	83 29 45.7
Pennsylvania Railroad north and south road crossing.	39 52 02.1	83 29 37.2
T.road north.....	39 50 34.5	83 29 49.1
Walnut Run, intersection of pike one mile north of...	39 50 59.3	83 27 57.6
Walnut Run, crossing of pikes at.....	39 50 06.7	83 27 54.9
T-road west.....	39 47 22.2	83 28 28.7
Creighton schoolhouse, T.road east at.....	39 45 20.1	83 28 53.8
Sedalia cross-streets at.....	39 44 00.5	83 28 36.7

SOUTH CHARLESTON QUADRANGLE.

This line starts from adjusted positions at Sedalia, follows public highways as nearly as possible along the south, west and north borders of the South Charleston Quadrangle connecting with adjusted position at Tradersville.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T.road north.....	39	44	02.7	83	30	01.9
Y.road east.....	39	43	41.5	83	31	32.1
Grasse Point Church T.road north at.....	39	43	50.2	83	32	00.2
Paint Creek, center of covered bridge over.....	39	43	58.2	83	32	31.6
T.road south.....	39	44	07.8	83	32	50.1
T.road north.....	39	44	11.4	83	34	51.6
Thomas schoolhouse, T.road south at.....	39	44	12.4	83	35	13.5
South Solon, Main street crossing Detroit Southern Railroad.....	39	44	14.9	83	36	34.1
South Solon, crossing of Main and Washington Sts...	39	44	15.5	83	36	50.7
South Solon, T.road south, one mile west of Madison and Green counties, stone monument between....	39	44	24.4	83	39	03.7
T.road southwest.....	39	44	36.7	83	39	47.9
Oakland schoolhouse, crossroads at.....	39	45	05.1	83	40	47.0
Gladstone, T.road west, about 1.75 miles north of....	39	45	59.1	83	41	47.1
Green and Clark county line, T.road east, near.....	39	46	44.3	83	42	00.7
Selma, crossing of pikes at.....	39	47	11.7	83	42	31.7
Selma, Pennsylvania Railroad at street crossing....	39	47	19.6	83	42	46.4
Selma, crossroads, .75 mile northwest of.....	39	47	47.6	83	43	15.4
T.road northeast.....	39	48	26.8	83	44	06.5
Pitchin, crossroads two miles southeast of.....	39	49	12.2	83	44	48.4
Pitchin, crossroads at.....	39	50	34.5	83	45	45.9
Pitchin, road west about one mile northwest of.....	39	51	24.7	83	46	26.8
Crossing of Springfield and Selma pikes and east and west roads.....	39	52	15.8	83	46	43.9
Crossroads.....	39	52	38.0	83	45	53.9
Calvary Cemetery, T.road west at.....	39	53	02.2	83	45	16.9
T. 5 R. 9, ¼ corner between secs. 14, 15.....	39	53	28.4	83	45	14.1
Locust Grove Church, road east at.....	39	53	35.9	83	45	01.4
Big Four Railroad, overhead road crossing north and south.....	39	54	22.2	83	44	40.0
Reeds schoolhouse, crossroads at.....	39	54	45.4	83	44	33.4
T. 5 R. 9 corner secs. 10 11, 16, 17.....	39	55	11.6	83	44	24.2
Crossing of old Columbus and Springfield Road, Buck Creek Lane.....	39	56	17.9	83	43	48.4
Township line crossing north and south road between secs. 7. 12, Ts. 5 and 6 R. 10.....	39	56	55.2	83	43	44.7
Big Four Railroad at northwest and southeast road crossing about 1.75 miles southwest of New Moorefield (azimuth 220° 41').....	39	58	25.9	83	43	54.3

Geographic positions along highways—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
New Moorefield, station (azimuth 220° 41').....	39 59 17.0	83 42 54.4
Big Four Railroad at east and west road crossing (azimuth 220 °41').....	39 59 31.1	83 42 41.5
Ts. 5 and 6 R. 10 corner secs. 3, 4, 33, 34.....	39 59 27.6	83 41 41.2
Intersection of east and west road and road north- west.....	39 58 58.0	83 40 51.4
T.road south.....	39 58 57.2	83 40 35.8
Bridge, west end of.....	39 59 27.1	83 39 18.0
Cemetery, T.road east at.....	39 59 43.3	83 38 50.1
T. 6 R. 10 corner secs. 15, 16, 21, and 22.....	39 59 15.4	83 38 18.4
Catawba, T.road west about one mile south of.....	39 59 12.9	83 37 32.5
Catawba, T.road northeast about 1.75 mile south....	39 58 38.8	83 37 20.5
Pleasant township, schoolhouse, road southeast at ..	39 58 54.4	83 36 06.6
T.road northwest.....	39 59 07.4	83 35 05.8
T.road southeast.....	39 59 18.0	83 34 15.6
Nation Chapel, Y.road .25 mile northwest of.....	39 59 39.4	83 32 38.6
Clark and Madison counties, stone monument be- tween.....	39 59 14.4	83 31 11.2

SPRINGFIELD QUADRANGLE.

This line starts from New Moorefield and follows public highways along the north, west and south borders of the quadrangle, connecting with lines run by Mr. George T. Hawkins near Osborn, and tied to position one mile north of Gladstone postoffice.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
New Moorefield, road crossing Big Four Railroad.....	39 59 31.14	83 42 41.51
New Moorefield, T.road south.....	39 59 32.5	83 43 05.5
T. 5, R. 10, corner secs. 9, 10, 15 and 16.....	39 59 36.3	83 44 01.5
T. 5, R. 10, corner secs. 15, 16, 21, and 22.....	39 59 39.9	83 45 10.1
T. 5, R. 10, corner secs. 21, 22, 27, 28.....	39 59 44.0	83 46 20.6
Springfield and Urbana pike at T.road east.....	39 59 50.1	83 48 02.8
T-road east.....	39 58 57.7	83 48 26.9
Erie Railroad, at east and west crossings, on long curve.....	39 58 27.9	83 48 44.1
Mad River, T.road north, near.....	39 58 41.2	83 49 50.3
Blacksmith shop, crossroads at.....	39 58 38.7	83 50 31.2
T.road north.....	39 58 57.3	83 51 22.1
Lawrenceville, intersection of roads in east part of....	39 59 08.8	83 52 09.7
T. 4, R. 10, corner secs. 20, 21, 26 and 27.....	39 59 14.6	83 53 19.2
T. 4, R. 10, corner secs. 26, 27, 32 and 33.....	39 59 18.8	83 54 28.2
North Hampton, road southeast one mile east of....	39 59 22.0	83 55 21.4
North Hampton, crossroads at.....	39 59 25.5	83 56 23.9
T. 3, R. 10, corner secs. 8, 9, 14 and 15.....	39 59 30.5	83 57 46.6
T. 3, R. 10, corner secs. 14, 15, 20 and 21.....	39 59 34.3	83 58 54.7
T. 3, R. 10, quarter corner between secs. 21, 22.....	39 59 36.2	83 59 28.8
T.road south.....	39 59 42.7	83 59 01.8
Liberty schoolhouse, T.road east 400 feet south of ...	39 57 45.4	83 59 05.5
Liberty Church, T.road south .5 mile west of	39 57 26.7	83 59 42.1
New Carlisle, T.road north 1.5 miles east of	39 55 52.9	83 59 50.0
T. 3, R. 10, corner secs. 21, 22 and 27 and 28.....	39 55 17.7	84 00 29.9
T. 3, R. 10, corner secs. 20, 21, 26 and 27.....	39 54 25.2	84 00 35.6
Midway, crossing of pikes at Tecumseh Hotel.....	39 52 55.6	84 00 35.0
Mad River, T.road east at.	39 52 33.3	83 59 42.2
Erie Railroad, at north and south road crossing (azimuth 241° 18').....	39 51 53.1	83 59 38.6
T. 3, R. 8, corner secs. 16, 17, 22 and 23.....	39 50 49.6	83 59 45.2
T. 3, R. 8, corner secs. 15, 16, 21 and 22.....	39 49 56.0	83 59 51.2
T. 3, R. 8, corner secs. 14, 15, 20 and 21	39 49 04.6	83 59 57.6
Crossing Xenia pike north and south road.....	39 48 42.8	83 58 51.6
T. 3 R. 8, corner secs. 7, 8, 13 and 14.....	39 48 07.2	83 58 54.7
Bryon, road north at.....	39 47 08.5	83 59 01.0
Bryon, T.road north 1.5 miles south and .5 mile west of.....	39 46 03.4	83 59 36.3

Geographic positions along highways—Continued.

Station.	Latitude.	Longitude.
	° ' "	° "
Bryon, T.road east 2.5 miles south of, is near T. 3, R. 7, quarter corner between secs. 10 and 16.....	39 45 05.5	83 59 15.2
T. 3, R. 7, $\frac{1}{4}$ corner between secs. 4 and 10.....	39 45 00.9	83 58 04.4
Xenia, intersection of Xenia and Fairfield pikes and road west 4 miles northwest of.....	39 44 55.7	83 56 30.4
Oldtown, Pennsylvania Railroad, at east and west crossing.....	39 44 38.3	83 55 49.4
T.road southwest	39 45 27.2	83 53 52.2
Clifton and Xenia and Yellow Springs and Cedarville pikes, crossing of.....	39 46 30.6	83 52 04.4
Cory schoolhouse, T.road northwest one-half mile southeast of.....	39 45 30.1	83 51 36.1
Cedarville, T.road southeast about 2.5 miles northwest of.....	39 45 46.6	83 50 45.8
Cedarville, T.road northeast one mile northwest of....	39 45 02.9	83 49 28.2
Cedarville, crossing Pennsylvania Railway (azimuth $225^{\circ} 24'$).....	39 44 23.7	83 48 20.9
Schoolhouse, crossroads at.....	39 43 05.1	83 46 31.1
Schoolhouse, T.road northwest 1.25 miles northeast of.....	39 43 22.4	83 45 11.3
Shiloh Academy, T.road north .5 mile east of.....	39 43 45.7	83 43 27.6
T.road northwest	39 43 55.1	83 42 46.0
Gladstone, intersection pikes $\frac{1}{4}$ mile south of.....	39 44 18.5	83 41 03.3
Gladstone, intersection of roads one mile north of....	39 45 17.7	83 41 15.7

DAYTON QUADRANGLE.

This line starts from a located point near Byron and follows public highways along south, west and north borders of sheet, connecting at Dayton with line run by Mr. George T. Hawkins, and tied to position at northwest corner of Springfield quadrangle.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Beaver Creek Schoolhouse T.road south, one-third mile north of.....	39	46	04.2	84	00	43.4
Beaver schoolhouse, T.road south 2-3 mile south of..	39	45	11.1	84	00	47.6
T. 3, R. 7, $\frac{1}{4}$ corner between secs. 22 and 28.....	39	45	13.2	84	01	28.6
T. 3, R. 7, $\frac{1}{4}$ corner between secs. 28 and 34.....	39	45	17.2	84	02	38.2
Big Woods schoolhouse, crossroads at.....	39	45	19.3	84	03	14.3
T.road north.....	39	45	24.4	84	04	37.4
Montgomery-Greene county line, at Fifth street road Cincinnati, Hamilton & Dayton Railway at Fifth street road crossing	39	45	29.7	84	06	00.9
East Dayton, intersection Smithville, road and Huffman avenue.....	39	45	34.7	84	07	18.7
Dayton, crossing of Huffman and Linden avenues ...	39	45	27.7	84	08	18.6
Dayton, crossing of Dayton & Union Railway and Third street.....	39	45	32.2	84	09	32.6
Dayton, crossing of Third and Main street.....	39	45	40.3	84	10	55.5
Dayton, crossing of Third and Main street.....	39	45	34.7	84	11	30.3
Dayton, intersection of Salem and Oxford avenues in northwest part of.....	39	46	09.4	84	12	40.9
Dayton, intersection Salem avenue and Catalpa Drive.....	39	46	56.9	84	13	31.7
T. 2, R. 6, corner secs. 17, 18, 19 and 20.....	39	47	27.7	84	14	06.0
T. 2, R. 6, corner secs. 7, 8, 18 and 18.....	39	48	20.6	84	14	05.9
Shiloh Church, crossroads at.....	39	49	11.4	84	14	07.4
Ts. 2, 3, 4 and 5 Rs. 5 and 6 corner secs. 31, 36, and 6...	39	50	01.4	84	15	15.2
T. 3, R. 6, $\frac{1}{4}$ corner between secs. 30 and 31.....	39	50	53.8	84	14	44.0
Spanker, crossroads at.....	39	51	33.0	84	14	42.3
Spanker, T.road east. one mile north of.....	39	52	16.6	84	14	43.1
Crossing National Road and north and south roads..	39	53	13.4	84	14	43.6
T. 3, R. 6, $\frac{1}{4}$ corner between secs. 6 and 7.....	39	54	28.3	84	14	45.1
Ts. 3 and 4, R. 6, $\frac{1}{4}$ corner between secs. 6 and 31 and line between Montgomery and Miami counties.....	39	55	20.2	84	14	46.2
T. 4 R. 6 $\frac{1}{4}$ corner between secs. 31 and 32.....	39	55	47.0	84	14	12.8
Schoolhouse No. 5, intersection of northeast and southwest road and road south.....	39	56	56.2	84	14	14.6
Troy crossroads 5 miles southwest of.....	39	57	57.9	84	13	39.1

Geographic positions along highways—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Troy, crossroads 4 miles southwest of.....	39	8	51.5	84	13	20.4
T. 4, R. 6, corner secs. 9, 10, 5 and 16.....	39	58	52.3	84	12	17.4
Schoolhouse No. 11, crossroads near.....	39	58	53.5	84	11	08.1
Lost Creek center of bridge over (azimuth 312° 40').....	39	59	07.4	84	09	40.9
Grayson, road crossing Big Four Railroad.....	39	59	44.9	84	08	39.3
Ragtown, T.road south at.....	40	00	04.2	84	07	29.5
T. 2, R. 10, corner secs. 14, 15, 20 and 21.....	39	59	57.4	84	05	47.2
T. 2, R. 10, corner secs. 8, 9, 14, and 15.....	39	59	53.4	84	04	39.1
T. 2, R. 10, corner secs. 2, 3, 8 and 9.....	39	59	49.1	84	03	31.6
Alcony, crossroads 1 mile east of.....	40	00	34.0	84	02	33.6
Alcony, T.road south two miles east of.....	40	00	07.8	84	01	12.8
Crossroads.....	39	59	42.4	84	00	02.5

MIDDLETOWN QUADRANGLE.

This line starts from adjusted position in west Dayton and follows public highways south along east border of quadrangle to Red Lion postoffice, connecting with adjusted position at that place.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
West Dayton, Big Four Railroad, east and west crossing 760 feet north of Railroad bridge (azimuth of Railroad $12^{\circ} 02'$).....	39 43 57.4	84 12 40.4
West Dayton intersection of Springboro pike and road southwest.....	39 43 30.0	84 13 01.6
West Dayton, Big Four Railroad at Springboro pike crossing north and south.....	39 42 14.8	84 13 08.5
T. 1, R. 6, corner secs. 10, 11, 16 and 17.....	39 41 40.3	84 13 11.3
T. 1, R. 6, $\frac{1}{4}$ corner between secs. 9 and 15.....	39 40 23.9	84 13 17.7
Ts. 1 and 2 R. 6, corner secs. 7, 13, 12 and 18.....	39 38 36.9	84 13 27.6
T. road west.....	39 37 43.8	84 13 32.3
Corner sections T. road east.....	39 36 46.9	84 13 37.6
Dunkard Church, crossroads at.....	39 35 48.9	84 13 42.8
T. 2, R. 4, corner secs. 8, 9, 14 and 15.....	39 34 30.8	84 13 50.1
Springboro, crossing of pikes in north part of.....	39 33 24.0	84 13 56.8
Ts. 2 and 3, R. 4, corner secs. 7, 12, 13, and 18.....	39 32 41.7	84 14 01.1
T. 3, R. 4, corner secs. 11, 12, 17 and 18.....	39 31 47.0	84 14 05.9
T. 3, R. 4, corner secs. 10, 11, 16 and 17.....	39 30 52.8	84 14 11.2
Red Lion, T. 3, R. 4, center secs. 15 at.....	39 29 28.2	84 14 55.4

This line starts from adjusted position 1 mile west of Trenton and follows public highways north along west border of quadrangle to north-west corner of same, fence east along north border connecting with original position in west Dayton.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Trenton, Ts. 1, 2, 2 and 3 Rs. 3 and 4, 1 mile west of..	39 28 51.0	84 28 35.8
Ts. 2 and 3, Rs. 3 and 4, E., corner secs. 25, 30, 31 and 36.....	39 29 43.3	84 28 36.5
Ts. 2 and 3, Rs. 2 and 4, E., corner secs. 19, 24, 25, and 30.....	39 30 35.9	84 28 37.3
Jacksonburg, T. road east 1.5 miles south of.....	39 31 00.7	84 30 14.5
Jacksonburg, crossroads at.....	39 32 19.7	84 30 07.1

Geographic positions along highways—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T-road east.....	39	33	12.2	84	29	49.5
T. 4, R. 3, $\frac{1}{4}$ corner between secs. 35 and 36.....	39	34	32.1	84	29	49.8
T. 4, R. 3, corner secs. 23, 24, 25 and 26.....	39	35	46.7	84	29	51.6
T. 3, and 4, Rs. 3 and 4, $\frac{1}{4}$ corner between secs. 19, and 24 T-road near.....	39	36	15.6	84	28	43.4
T-road east.....	39	37	16.3	84	28	44.5
Crossing Germantown and Winchester and Farmers- ville and Middletown pikes.....	39	38	09.8	84	28	45.4
Ts. 3 and 4, corner secs. 1, 6, 7 and 12.....	39	38	30.4	84	28	45.8
Ts. 3 and 4, Rs. 3 and 4, corner secs. 1 and 6, (north corner).....	39	39	26.2	84	28	46.6
T-road east.....	39	40	39.4	84	28	47.9
Cincinnati Northern Railroad, at county line road crossing north and south.....	39	41	53.1	84	28	49.3
Ts. 4 and 5, Rs. 3 and 4, $\frac{1}{4}$ corner secs. 13 and 18.....	39	42	30.6	84	28	50.0
Crossing county line road and West Alexandria and Germantown pike.....	39	43	23.1	84	28	51.2
Ts. 4 and 5, Rs. 3 and 4, corner secs. 1, 6, 7 and 12.....	39	43	51.2	84	28	52.0
Ts. 4, 5, 5, and 6, Rs. 3 and 4.....	39	44	42.1	84	28	53.1
T-road south.....	39	44	42.7	84	27	41.7
T-road north.....	39	44	43.2	84	26	44.0
T. 5, R. 4, E., corner secs. 34 and 33 (south corner)..<	39	44	43.7	84	25	21.4
T. 5, R. 4 E., corner secs. 34 and 35 (south corner)..<	39	44	44.4	84	24	13.7
Ts. 4 and 5, R. 4 E., corner secs. 1, 2, 35, and 36....	39	44	44.9	84	23	05.8
T. 3, 4, 4, and 5, Rs. 4 and 5 E. corner secs. 1, 6, 31 and 36.....	39	44	45.5	84	21	58.4
Ts. 3 and 4, R. 5 E. corner secs. 5, 6, 31 and 32.....	39	44	45.9	84	20	50.3
Ts. 3 and 4, R. 5 E. corner secs. 4 and 5 (north corner)..<	39	44	46.6	84	19	42.3
T. 4, R. 5 E. corner secs. 33 and 34 (south corner)..<	39	44	47.2	84	18	34.0
Miller avenue, north.....	39	44	48.0	84	16	55.2
Soldiers' Home, crossing of Eaton pike and north and south road at northeast corner of.....	39	44	58.4	84	15	10.4
West Dayton, West Third street crossing C. H. & D. Railroad.....	39	45	06.3	84	14	23.1

BROOKVILLE QUADRANGLE.

This line starts from adjusted position about four miles southwest of Troy, and follows public highways and Big Four Railway to northwest corner of quadrangle, thence along border of quadrangle and connects with traverse line of Mr. George T. Hawkins, at Baltimore, thence south to southwest corner of quadrangle connecting with adjusted position.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 4, R. 6, corner secs. 4, 5, 8 and 9, crossroads near...	39	59	44.6	84	13	19.9
T. 4, R. 5, corner secs. 5, 6, 7 and 8.....	39	59	43.0	84	14	19.7
Ts. 4 and 6, Rs. 5 and 6 corner secs. 1, 6, 7 and 12...	39	59	42.0	84	15	27.7
Burkett pike, crossing Big Four Railroad.....	39	59	41.9	84	15	49.0
T. 6, R. 5, corner secs. 2, 3, 10 and 11.....	39	59	40.5	84	17	41.9
Burkett Pike crossing, on curve Big Four Railroad...	39	59	39.7	84	18	36.6
Ludlow Falls, T. road east .5 mile south of.....	39	59	37.9	84	20	08.6
Ludlow Falls, road crossing 160 feet west of depot...	39	59	50.7	84	20	14.2
Road crossing north and south near milepost 316 (azi- muth of Railroad 96° 18').....	39	59	31.8	84	21	40.7
Laura, pike crossing 1 mile east of.....	39	59	31.5	84	23	34.4
Laura, road crossing north and south at depot.....	39	59	25.4	84	24	30.6
T. 7, R. 4, corner secs. 3, 4, 9 and 10.....	39	59	32.5	84	25	38.3
Section line road crossing north and south.....	39	59	19.3	84	26	47.0
Section line crossing north and south.....	39	59	18.8	84	27	54.0
Pittsburg Twp. line, road crossing north and south Pittsburg (Azimuth of the Big Four Railroad 89° 76')	39	59	18.2	84	29	14.3
Ts. 7 and 8, Rs. 3 and 4, corner secs. 7, 12, 13 and 18..	39	58	36.2	84	29	13.2
Germany, schoolhouse, crossroads about 900 feet east of.....	39	57	45.1	84	28	49.3
Crossroads.....	39	57	19.2	84	28	48.6
Schoolhouse No. 6, T. road south at.....	39	56	01.5	84	28	59.3
Crossroads at line between Darke and Montgomery counties.....	39	59	07.5	84	28	58.1
Ts. 6 and 7, Rs. 3 and 4 E., corner secs. 1, 6, 12 and 7, at Baltimore.....	39	54	12.6	84	29	06.5
D. and N. R. R., at county line crossing.....	39	53	55.1	84	29	06.0
Ts. 6 and 7, Rs. 3 and 4 E., corner secs. 7, 12, 13 and 18.....	39	53	20.1	84	29	05.0
Ts. 6 and 7, Rs. 3 and 4, E. corner secs. 13, 18, 19 and 24.....	39	52	27.7	84	29	03.6
A. of Pennsylvania R. R., .5 mile north of National road 297° 27'.....						
Crossing National road and county line road.....	39	51	36.5	84	29	02.2
Ts. 6 and 7, Rs. 3 and 4 E., corner secs. 25, 30, 31 and 36.....	39	50	42.6	84	29	00.9

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ts. 5, 6, and 7, Rs. 3 and 4 E., corner secs. 1, 6, 31 and 36.....	39 49 50.2	84 28 59.8
Ts. 5 and 6, Rs. 3 and 4 E., $\frac{1}{4}$ corner between secs. 7 and 12.....	39 48 37.2	84 28 58.1
Ts. 5 and 6, Rs. 3 and 4 E., corner secs. 7, 12, 13 and 18.....	39 48 11.2	84 28 57.5
Ts. 5 and 6, Rs. 3 and 4 E., corner secs. 13, 18, 19 and 24.....	39 47 18.7	84 28 56.3
Ts. 5 and 6, Rs. 3 and 4 E., corner secs. 19, 24, 25 and 30.....	39 46 26.9	84 28 55.0
Ts. 5 and 6, Rs. 3 and 4 E., corner secs. 25, 30, 31 and 36.....	39 45 34.4	84 28 53.9

WEST MANCHESTER QUADRANGLE.

This line starts from adjusted position at southeast corner of quadrangle and follows highways west along south border to southwest corner of quadrangle. Thence via highways along west border to point near northwest corner of quadrangle, thence east along Big Four Railroad connecting with primary traverse line of Mr. George T. Hawkins at Arcanum, and thence east on the Big Four Railroad to Pittsburg, where it connects with adjusted position.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Ts. 5 and 6, Rs. 3 E., corner secs. 1, 2, 35 and 36	39	44	41.7	84	30	01.0
Ts. 5 and 6, R. 3 E., corner secs. 2, 3, 34 and 35	39	44	41.2	84	31	09.4
West Alexandria, crossing of Dayton and Main street. Azimuth, on Cincinnati Northern Ry. in West Alexandria is 336° 32'	39	44	40.9	84	31	54.5
Ts. 5 and 6, R. 3 E., corner secs. 4, 5, 32 and 33	39	44	40.4	84	33	25.3
T. 8, R. 3, corner secs. 31 and 32	39	44	39.9	84	34	32.8
T. 8, Rs. 2 and 3 E., corner secs. 31 and 36	39	44	39.4	84	35	40.1
Ts. 7 and 8, R. 3 E., corner secs. 1, 2, 35 and 36	39	44	38.9	84	36	45.8
Eaton, crossing Pennsylvania R. R. and Main street, Azimuth = 168° 28'	39	44	39.0	84	37	47.4
Eaton, intersection of Main street and Richmond pike, in west part of	39	44	38.9	84	38	27.0
Ts. 7 and 8, R. 2 E., corner secs. 4, 5, 32 and 33	39	44	38.2	84	40	08.3
Ts. 7 and 8, Rs. 1 and 2 E., corner secs. 1, 6, 31 and 36	39	44	37.8	84	42	11.5
T. 8, R. 1 E., corner secs. 35 and 36	39	44	37.8	84	43	18.8
T. 8, R. 1 E., corner secs. 23 and 24, 25 and 26	39	46	23.4	84	43	18.6
Azimuth P. R. R. between these two positions, 112° 19'						
T. 8, R. 1 E., corner secs. 13, 14, 23 and 24	39	47	16.8	84	43	20.1
T. 8, R. 1 E., corner secs. 11, 12, 13 and 14	39	48	08.9	84	34	21.4
T. 8, R. 1 E., corner secs. 1, 2, 11 and 12	39	49	01.1	84	43	21.5
Ebenezer, T road south at	39	50	26.1	84	43	22.3
T. 9, R. 1 E., corner secs. 23, 24, 25 and 26	39	51	28.6	84	43	22.6
T. 9, R. 1 E., corner secs. 13, 14, 23 and 24	39	52	21.6	84	43	22.6
T road west	39	52	52.7	84	44	18.6
T. 9, R. 1 E., corner secs. 1, 2, 11 and 12	39	55	07.5	84	43	24.2
Ts. 9 and 10, R. 1 E., corner secs. 1, 2, 35 and 36	39	55	00.6	84	43	24.3
New Madison Crossroads, 2½ miles south of	39	55	50.2	84	43	22.7
T. 10, R. 1 E., corner secs. 25, 26, 35 and 36	39	56	45.9	84	43	21.3

Geographic positions along the Pennsylvania R. R.

Station.	Latitude.	Longitude.
	° ' "	° ' "
New Madison, road crossing 200 feet southwest of	39 58 08.5	84 42 41.0
Road crossing northwest and southeast	39 58 39.1	84 41 48.0

Geographic positions along the "Big Four" Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 10, R. 2 E., corner secs. 4, 5, 8 and 9	39 59 23.4	84 40 17.2
Savona, crossing Cincinnati Northern Ry	39 59 12.7	84 39 43.6
Road crossing north and south	39 59 13.0	84 39 10.1
Road crossing north and south	39 59 13.7	84 37 53.0
Greenville and Lewisburg, pike crossing	39 59 14.3	84 36 48.0
Private road crossing	39 59 15.0	84 35 28.4
Road crossing north and south	39 59 15.5	84 34 35.5
Arcanum, crossing Dayton and Union R. R.	39 59 16.3	84 33 09.5
Road crossing north and south	39 59 16.8	84 32 03.7
Road crossing north and south	39 59 17.3	84 30 56.4

Geographic positions along the spur line from Ebenezer west to Ohio-Indiana state line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Ebenezer, crossing National road and north and south road 1.5 miles west of	39 59 19.7	84 44 47.7
Crossing National road and New Paris and Westerville pike	39 50 08.8	84 47 35.5
Crossing National road and Ohio-Indiana state line . . .	39 50 01.9	84 48 48.0

GREENVILLE QUADRANGLE.

This line starts from adjusted position at Pittsburg and follows highways north along east border of quadrangle to northeast corner of same, thence west along highways to northwest corner of quadrangle, thence south along highways connecting with adjusted position two miles north of New Madison.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Pittsburg, road crossing Big Four R. R.	39	59	18.2	84	29	14.3
T. 8 N., Rs. 3 and R. E., corner secs. 1, 6, 7 and 12.	39	59	28.6	84	29	14.6
Ts. 7, 8 and 9 N., Rs. 3 and 4 E., corner secs. 1, 6, 31 and 36.	40	00	23.1	84	29	16.3
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 25, 30, 31 and 36.	40	01	15.6	84	29	17.8
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 19, 24, 25 and 30.	40	02	07.9	84	29	19.4
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 13, 18, 19 and 24.	40	03	00.5	84	29	21.1
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 7, 12, 13 and 18.	40	03	53.0	84	29	22.8
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 1, 6, 7 and 12	40	04	45.2	84	29	24.3
Ts. 8 and 9 N., Rs. 3 and 4 E., corner secs. 1, 6, 31 and 36.	40	05	43.2	84	29	26.1
Gettysburg, crossing Main street and north and south road.	40	06	42.0	84	29	44.4
Gettysburg, crossroad .5 mile north of.	40	07	21.9	84	29	50.9
Pennsylvania Railroad at north and south road crossing 400 feet east of milepost 87, azimuth 103° 20'. ..	40	08	38.8	84	29	53.1
Oakland Church, T road south .25 mile east of.	40	09	07.5	84	29	53.6
Oakland Church, T road east 1 mile north of.	40	09	57.4	84	30	03.9
Webster crossroads, 1 mile west of.	40	10	53.0	84	30	03.8
T. 11 N., R. 3 E., $\frac{1}{4}$ corner between secs. 25 and 36.	40	11	45.5	84	30	10.2
T. 11 N., R. 3 E., $\frac{1}{4}$ corner between secs. 24 and 25.	40	12	38.0	84	30	11.2
T. 11 N., R. 3 E., corner secs. 23, 24, 25 and 26.	40	12	37.2	84	30	46.0
4,000 feet north of last: azimuth Big Four R. R. = 84° 37'.						
T. 11 N., R. 3 E., corner secs. 13, 14, 23 and 24.	40	13	29.8	84	30	47.4
Versailles, crossing Versailles and Brock pike and north and south road, 2 miles northwest of.	40	14	26.4	84	30	48.6
Frenchtown, crossroads .5 mile east of.	40	14	48.5	84	30	49.2
Frenchtown, T road south, .5 mile west of.	40	14	47.1	84	32	15.9
Frenchtown, crossroads 2 miles west of.	40	14	45.3	84	34	00.6
T. road south.	40	15	21.1	84	35	24.7
Schoolhouse No. 6, T. road west at.	40	15	28.3	84	35	57.6

Geographic positions along highways—Continued.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. 13 N., R. 2 E., $\frac{1}{4}$ corner between secs. 1 and 2	40 15 28.1	84 36 52.3
T. road east near $\frac{1}{4}$ corner between secs. 2 and 3, T. 13 N., R. 2 E.	40 15 28.4	84 38 10.9
Cincinnati Northern R. R., at east and west road crossing	40 15 02.5	84 38 34.7
T. 13 N., R. 2 E., corner secs. 3, 4, 9 and 10	40 15 02.5	84 39 08.8
T. 13 N., R. 2 E., $\frac{1}{4}$ corner between secs. 8 and 9	40 14 36.3	84 40 17.5
T. 13 N., R. 2 E., $\frac{1}{4}$ corner between secs. 7 and 8 cross-roads near	40 14 36.7	84 41 36.3
T. 13 N., Rs. 1 and 2 E., $\frac{1}{4}$ corner between secs. 7 and 12	40 14 37.1	84 42 32.5
T. 13 N., R. 1 E., $\frac{1}{4}$ corner secs. 11 and 12	40 14 40.6	84 43 40.7
T. 13 N., R. 1 E., corner secs. 11, 12, 13 and 14	40 14 14.3	84 43 40.4
T. 13 N., R. 1 E., corner secs. 13, 14, 23 and 24	40 13 21.8	84 43 39.9
900 feet south of this, Big Four Railroad azimuth = $84^{\circ} 29'$		
T. 13 N., R. 1 E., corner secs. 23, 24, 25 and 26	40 12 29.3	84 43 39.2
$\frac{1}{2}$ mile south of this, Pennsylvania Ry. azimuth = $103^{\circ} 19'$		
T. 13 N., R. 1 E., corner secs. 25, 26, 35 and 36	40 12 29.3	84 43 39.2
Ts. 12 and 13 N., R. 1 E., $\frac{1}{4}$ corner secs. 1, 2, 35 and 36	40 10 43.7	84 43 39.0
T. 12 N., Rs. 1 and 2 E., $\frac{1}{4}$ corner secs. 1, 6, 7 and 12	40 09 55.5	84 42 29.2
T. 12 N., Rs. 1 and 2 E., $\frac{1}{4}$ corner secs. 7 and 18	40 09 02.6	84 42 28.3
Coaltown, center of bridge .25 mile west of	40 08 04.0	84 42 22.2
Coaltown, T road east 1.5 mile southwest of	40 07 17.6	84 42 26.5
Greenville and Spartanburg and Coaltown and New Manchester pikes, crossing of	40 05 41.8	84 42 24.8
Greenville and Winchester pike and Coaltown and New Manchester pikes, crossing of	40 06 23.4	84 42 25.5
T. 11 N., Rs. 1 and 2 E., corner secs. 1, 6, 7 and 12	40 04 38.5	84 42 23.4
T. 11 N., R. 1 E., corner secs. 1, 2, 11 and 12	40 04 38.2	84 43 30.4
T. 11 N., R. 1 E., corner secs. 11, 12, 13 and 14	40 03 45.7	84 43 29.5
T road west	40 02 34.7	84 43 27.4
T. 11 N., R. 1 E., corner secs. 25, 26 35 and 36	40 01 08.3	84 43 25.8

Geographic positions along the "Big Four" R. R.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Charles Station, road crossing 1 mile southeast of	40 00 15.7	84 42 37.0
Pike crossing north and south under trestle	40 00 05.4	84 42 18.4
Pennsylvania R. R., crossing of	39 59 23.0	84 41 02.3

ST. HENRY'S QUADRANGLE.

This line starts from adjusted position at southwest corner of quadrangle and follows highways north to near northwest corner of quadrangle, thence east along highways to Montgomery, thence south along Cincinnati, Hamilton and Dayton Railroad and highways to adjusted position .5 mile east of Frenchtown.

Geographic positions along highways.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 13 N., R. 1 E., corner secs. 1, 2, 11 and 12.....	40	15	06.9	84	43	40.9
T. 14 N., R. 1 E., corner secs. 27, 28, 33 and 34.....	40	16	54.3	84	44	49.8
Ts. 13 and 14 N., R. 1 E., corner secs. 2, 3, 33 and 34..	40	16	02.2	84	44	49.0
T. 14 N., R. 1 E., corner secs. 21 and 22, 27 and 28...	40	17	40.6	84	44	48.9
T. 14 N., R. 1 E., $\frac{1}{4}$ corner between secs. 15 and 22...	40	18	32.8	84	44	14.5
T. 14 N., R. 1 E., corner secs. 10, 11, 14 and 15.....	40	19	24.3	84	43	39.5
T. 14 N., R. 1 E., corner secs. 2, 3, 10 and 11.....	40	20	16.6	84	43	38.9
Ts. 14 and 15 N., R. 1 E., corner secs. 2, 3, 34 and 35..	40	21	08.9	84	43	38.4
Viola, crossing pike and north and south road.....	40	22	04.4	84	42	38.8
Road southwest.....	40	22	53.2	84	42	08.0
T. 15 N., R. 1 E., $\frac{1}{4}$ corner between secs. 24 and 25...	40	22	53.6	84	43	09.4
T. 15 N., R. 1 E., $\frac{1}{4}$ corner between secs. 13 and 24...	40	23	46.7	84	43	08.6
Schoolhouse, T road south at.....	40	24	15.6	84	48	08.6
T. 7 S., R. 1 E., corner secs. 13, 14, 23, 24.....	40	25	17.9	84	42	27.5
T. 7 S., R. 1 E., corner secs. 11, 12, 13, 14.....	40	26	10.5	84	42	27.6
Ts. 6 and 7 S., R. 1 E., corner secs. 1, 2, 35 and 36...	40	27	55.4	84	42	27.8
T. 7 S., R. 1 E., corner secs. 1, 2, 11, 12.....	40	27	02.9	84	42	27.8
T. 6 S., R. 1 E., corner secs. 25, 26, 35 and 36.....	40	28	47.9	84	42	27.8
T. 6 S., Rs. 1 and 2 E., corner secs. 25, 30, 31 and 36	40	28	47.9	84	41	19.2
T. 6 S., R. 2 E., corner secs. 29, 30, 31 and 32.....	40	28	47.9	84	40	00.1
T. 6 S., R. 2 E., corner secs. 28, 29, 32 and 33.....	40	28	48.0	84	38	51.4
T. 6 S., R. 2 E., corner secs. 27, 28, 33 and 34.....	40	28	47.9	84	37	43.0
Coldwater, crossing Cincinnati Northern R. R. and Main street.....	40	28	47.9	84	37	38.5
T. 6 S., R. 2 E., corner secs. 26, 27, 34 and 35.....	40	28	48.2	84	36	34.3
Coldwater, crossroads 2 miles east of.....	40	28	52.3	84	35	25.9
Montezuma Station, crossroads 1 mile west of.....	40	29	01.7	84	34	16.9
Montezuma Station, road crossing Cincinnati, Hamilton and Dayton R. R. north of.....	40	29	18.0	84	33	10.1
Road crossing east and west.....	40	28	49.1	84	32	38.8
Ts. 6 and 7 S., R. 2 E., corner secs. 32, 33, 4 and 5...	40	27	56.4	84	31	53.3
Road crossing north and south.....	40	27	19.7	84	31	01.8
Road crossing north and south.....	40	26	48.1	84	30	27.5
Chickasaw, Main street crossing.....	40	26	15.7	84	29	50.2
Maria Stein Station, road crossing.....	40	24	28.2	84	29	35.5

Geographic positions along highways.—Continued.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 7 S., R. 3 E., corner secs. 26, 27, 34 and 35.....	40	23	35.3	84	29	36.4
Ts. 7 and 8 S., R. 3 E., corner secs. 2, 3, 34 and 35....	40	22	42.7	84	29	36.6
Ts. 7 and 8 S., R. 3 E., corner secs. 2, 3, 11 and 12....	40	21	16.0	84	29	42.5
Osgood Station, street crossing 75 feet south of.....	40	20	24.0	84	29	42.0
Ts. 1 and 12 N., Rs. 3 and 4 E., secs. 7, 12, 13 and 18..	40	19	31.8	84	29	42.7
Road crossing east and west near schoolhouse.....	40	18	23.2	84	29	42.1
Road crossing about 500 feet east of $\frac{1}{4}$ corner between secs. 25 and 30 T. 11 N., Rs. 3 and 4 E.....	40	17	30.9	84	29	37.0
T. road west at center sec. 36, T. 11 N., R. 3 E.....	40	16	28.5	84	30	15.5
T. 11 N., R. 3 E., center sec. 12.....	40	14	49.5	84	30	14.2

Geographic positions along spur line west from near northwest corner of Greenville quadrangle.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 13 N., R. 1 E., $\frac{1}{4}$ corner between secs. 10 and 11...	40	14	40.7	84	44	48.1
T. 13 N., R. 1 E., center sec. 9, crossroads near.....	40	14	43.2	84	46	30.6
Ohio-Indiana state line at blacksmith shop.....	40	14	45.9	84	48	16.2

Geographic positions along spur line west from near northwest corner of St. Henry quadrangle.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 6 S., R. 1 E., corner secs. 26, 27, 34 and 35.....	40	28	47.9	84	43	36.8
T. 6 S., R. 1 E., corner secs. 27, 28, 33 and 34.....	40	28	47.9	84	44	45.7
T. 6 S., R. 1 E., corner secs. 28, 29, 32 and 33.....	40	28	48.0	84	45	54.2
T. 6 S., R. 1 E., corner secs. 29, 30, 31 and 32.....	40	28	48.5	84	42	02.9
Ohio-Indiana state line near $\frac{1}{4}$ corner between secs. 25 and 30, T. 6 S., Rs. 1 E. and 1 W.....	40	29	06.1	84	48	10.3

PRIMARY TRAVERSE.

ASHTABULA COUNTY.

(Jefferson and Andover Quadrangles.)

The following geographic positions were determined by primary traverse run by Mr. C. B. Kendall, field assistant, during the summer of 1903. The line begins at Andover triangulation station of the United States Lake Survey, near Andover, and runs northwesterly along Lake Shore and Michigan Southern Railway to Jefferson, thence west via highways to the 81st meridian, thence south to parallel $41^{\circ} 30'$, thence east to milepost 33 on Ohio-Pennsylvania State line. A line was run south from Jefferson along meridian $80^{\circ} 45'$ to parallel $41^{\circ} 30'$; and another east from Jefferson to mile post 15 on Ohio-Pennsylvania State line. A tie was also made to United States Lake Survey station Thompson in north-eastern Geauga county, and Mesopotamia in northwestern Trumbull county. Positions are given on the United States standard datum.

Geographic positions along Lake Shore and Michigan Southern Railway between Leon and Jefferson.

Station.	Latitude.	Longitude.
	° ' "	" ' °
Leon, road crossing 1,000 feet north of.....	41 39 24.2	80 36 59.0
Dorset station, low grade line crossing.....	41 41 29.7	80 40 31.1
Jefferson station, 300 feet south of center east siding at street crossing.....	41 44 17.3	80 45 41.2
Road crossing.....	41 42 40.8	80 42 47.4

Geographic positions along highways from Jefferson west to the 81st Meridian.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Jefferson, 2.5 miles west of, three corners	41 45 08.4	80 47 57.6
Austinburg, four corners at.....	41 46 18.3	80 51 17.4
Austinburg, 2.5 miles west of, four corners.....	41 46 01.9	80 53 59.9
Forks of road, road northeast.....	41 45 46.3	80 55 17.5
Harpersfield center, four corners at.....	41 45 33.2	80 56 47.8
Residence of J. H. and L. D. Fowler, four corners at..	41 45 33.2	81 00 10.2

Geographic positions along 81st meridian between parallels 41° 45' and 41° 30'.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Three corners.....	41 44 33.6	80 59 47.2
Mill creek, center of bridges over.....	41 42 45.4	80 59 32.0
Four corners.....	41 41 54.7	80 59 35.6
Special school district No. 2, four corners at.....	41 41 24.4	81 00 58.8
Four corners.....	41 40 41.3	81 00 58.6
Folleys four corners.....	41 39 57.7	81 00 59.0
Catholic Church, three corners just south of.....	41 38 30.4	81 00 59.4
Trumbull creek, center of iron highway bridge.....	41 38 08.2	81 00 09.9
Hart's Grove school district No. 4, three corners....	41 37 58.7	80 59 32.4
Four corners.....	41 37 08.7	80 59 32.3
Four corners at signpost "Hartsgrove 2 miles".....	41 36 19.8	80 59 32.3
Schoolhouse, district No. 7, four corners.....	41 36 30.7	80 59 32.3
Three corners, south edge of east and west road.....	41 33 50.3	80 59 30.3
Stoneville, .25 mile west of, four corners.....	41 33 14.2	80 57 47.1
Windsor Mills, three corners at top of hill near church.	41 32 06.7	80 57 44.7
Windsor Mills, south end of covered highway bridge over Phelps creek.....	41 31 58.3	80 57 50.8
Three corners, forks to east.....	41 31 22.7	80 57 54.7
Iona postoffice, four corners at.....	41 30 30.7	80 58 22.6
Wade schoolhouse, .75 mile west of, three corners, fork to south.....	41 30 54.4	80 44 12.2
Wade schoolhouse, .75 mile south of, three corners...	41 30 23.0	80 43 22.3
Four corners.....	41 30 22.7	80 41 06.7
Three corners.....	41 30 38.2	80 39 58.6
White schoolhouse, three corners at.....	41 30 31.3	80 38 52.1
Four corners.....	41 30 35.4	80 37 22.4
Stanhope creamery, .6 mile north of, three corners...	41 30 24.2	80 36 20.3
Stanhope creamery, three corners at Pennsylvania Ry. crossing.....	41 29 54.1	80 36 17.1
Pennsylvania Ry. crossing, .5 mile east of four cor- ners.....	41 29 54.3	80 35 50.2
Four corners.....	41 29 55.5	80 34 12.8
Stratton creek, center of bridge over.....	41 29 56.0	80 33 28.0
Cornelian, four corners at.....	41 29 34.9	80 31 50.7
Ohio-Pennsylvania state line, milepost 33.....	41 29 34.0	80 31 09.6

Geographic positions along highways from Jefferson south to parallel 41° 30'.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Jefferson station, .6 mile south of, fork of road to southeast.....	41 43 53.0	80 45 51.7
Lenox, 1 mile north of, four corners.....	41 41 40.7	80 45 42.2
Lenox, four corners at.....	41 40 47.8	80 45 41.3
Township line, New Lynne and Lenox, four corners at	41 38 35.4	80 45 39.1
Three corners, road east.....	41 37 27.3	80 45 47.1
Four corners.....	41 36 17.8	80 45 46.9
Four corners.....	41 35 44.0	80 46 49.2
South New Lynne, four corners near hotel.....	41 34 56.1	80 46 35.8
Four corners.....	41 33 26.7	80 46 12.8
Colebrook, four corners at.....	41 32 08.8	80 45 45.4

Geographic positions along highways from Jefferson east to milepost 15 on Ohio-Pennsylvania state line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Jefferson, Lake Shore and Michigan Southern Ry., 1.37 miles east of, forks of road to southeast.....	41 44 17.4	80 44 04.3
Forks of road.....	41 45 06.5	80 43 34.8
Lake Shore and Michigan Southern Ry., low grade line crossing.....	41 45 03.8	80 42 18.8
Four corners.....	41 45 05.4	80 41 07.8
Giddings postoffice, four corners at	41 45 05.4	80 40 04.0
Gould postoffice, three corners at church just north of	41 45 07.4	80 37 22.0
Creek, center of bridge over.....	41 45 03.9	80 36 05.7
Pierpont, three corners at soldiers' monument.....	41 45 08.4	80 34 13.4
Pierpont, 1.75 miles west of, four corners.....	41 45 09.4	80 32 05.5
Milepost 15, Ohio-Pennsylvania state line, three corners near.....	41 45 09.7	80 31 10.3
Milepost 15.....	41 45 12.9	80 31 10.0

Geographic positions along Baltimore and Ohio Southwestern Railway.

Station.	Latitude.	Longitude.
	° ' "	° ' "
N. W. and S. E. road crossing.....	39 27 41.1	83 46 11.2
Blind siding, road crossing near.....	39 27 56.2	83 45 05.3

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T.road northwest.....	39 28 23.3	83 44 21.9
T.road southeast.....	39 29 31.3	83 45 40.9
T.road east.....	39 29 54.9	83 47 06.4
T.road north.....	39 30 03.0	83 48 04.1
Intersection of roads.....	39 30 05.5	83 48 56.7
Crossroads.....	39 29 57.8	83 50 27.2
Gurneyville, crossroads 1 mile southeast of.....	39 30 24.8	83 51 29.9
Gurneyville, crossroads at.....	39 30 53.2	83 52 37.3
T.road north.....	39 31 13.4	83 53 43.5

Geographic positions along the Detroit Southern R. R.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Private road crossing.....	39 31 14.2	83 54 28.9
Road crossing north and south.....	39 30 42.9	83 55 14.3
Kingman, road crossing.....	39 29 58.9	83 56 21.7

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
St. John's church, T.road south near.....	39 29 46.9	83 58 54.6
T.road west.....	39 29 08.7	83 58 56.8
Hickoryville, T.road east just south of.....	39 27 53.2	83 59 41.0
Road west.....	39 27 10.4	83 59 37.1
Vandivert crossroads.....	39 26 39.6	83 59 18.7
T.road west.....	39 25 46.0	83 58 59.0
Pennsylvania R. R., at private road crossing, azimuth of R. R. 61° 01'.....	39 24 25.2	83 58 37.9
Clarksville, crossing Wilmington and Cincinnati pike and Main street.....	39 24 03.3	83 58 50.6
Intersection Wilmington and Cincinnati pike and Blanchester road.....	39 23 40.6	83 15 59.3
T.road northwest.....	39 22 04.5	83 58 17.9
Crossroads.....	39 21 33.8	83 59 04.2
T.road southeast.....	39 21 11.9	83 59 37.3
Blanchester, crossroads 3 miles northeast of.....	39 19 45.5	83 58 08.7
Road north.....	39 18 55.4	83 59 01.8
T.road.....	39 17 53.1	83 59 32.9

Geographic positions between Iona and Mesopotamia triangulation station.

Station.	Latitude.	Longitude.
	° ' "	° ' "
County line, four corners at.....	41 30 31.1	81 00 11.4
Three corners, forks west.....	41 28 44.9	81 00 11.9
Four corners, center of road of Middlefield township..	41 27 31.3	81 00 12.4
Mesopotamia triangulation station.....	41 26 59.75	80 59 53.15

Geographic positions along parallel 41° 30' between meridian 81° and milepost 33 on Ohio-Pennsylvania state line.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Four corners.....	41 30 30.2	80 56 21.1
Forks of road to northwest.....	41 30 30.0	80 55 16.6
Grand River, center of covered bridge over.....	41 30 18.1	80 54 28.0
Four corners.....	41 29 20.6	80 53 49.4
Schoolhouse, four corners at.....	41 29 20.3	80 52 46.3
Four corners on State road.....	41 29 20.5	80 52 05.7
Orwell, 1 mile south of four corners.....	41 31 16.1	80 52 04.6
Pennsylvania Ry. crossing.....	41 31 16.0	80 50 53.3
Three corners, road to north.....	41 31 16.2	80 49 47.1
Three corners.....	41 31 16.0	80 48 36.8
Three corners.....	41 31 20.0	80 47 26.6
Three corners.....	41 30 19.6	80 46 42.8
Schoolhouse, three corners at.....	41 30 51.9	80 45 17.6

Reference marks:— 8 feet east to fence line.

168 feet northwest to southeast corner of schoolhouse.

55 feet southwest to nail in root of maple tree.

CLINTON AND WARREN COUNTIES.

(Wilmington Quadrangle.)

This line, run by Mr. J. R. Ellis, starts from adjusted positions at Blanchester and follows highways to southwest corner of quadrangle, thence to Westboro via B. & O. Railroad to southeast corner of quadrangle; thence along highway to Blind Siding four miles northeast of Wilmington where it connects with primary traverse by Mr. George T. Hawkins, thence along highway to north wherever the line connects with original position.

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Blanchester, main street crossing B. & O. Railroad...	39 17 31.4	83 59 14.2
Road southeast.....	39 16 34.1	83 59 43.1
Road northwest.....	39 13 31.4	84 00 09.2
Woodville, intersection of road .25 mile east of.....	39 15 19.2	84 00 26.3
Pike road southeast.....	39 15 42.0	83 59 19.3
Blanchester, crossroad 2 miles southeast of.....	39 16 06.0	83 33 13.9
Road northeast.....	39 15 36.7	83 57 39.7
T. road southeast.....	39 15 58.1	83 56 37.8
Road south.....	39 16 24.6	83 55 16.7

Geographic positions along the Baltimore & Ohio Southwestern Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Westboro station road crossing 300 feet west of	39 16 51.3	83 54 38.6
Private road crossing north and south.....	39 16 35.5	83 55 48.0
Private road crossing north and south.....	35 16 17.7	83 52 45.3
Road crossing north and south.....	39 16 00.6	83 52 02.7
Klocks station road crossing at.....	39 15 24.5	83 50 14.3
Private road crossing north and south.....	39 15 06.7	83 49 21.1
Road crossing north and south.....	39 14 35.0	83 47 45.6
Lynchburg, Main street crossing at.....	39 14 30.5	83 47 32.4
Road crossing north and south.....	39 14 08.4	83 46 26.6

Geographic positions along highways.

Station.	Latitude.	Longitude.
	° ' "	° ' "
T. road south.....	39 15 12.9	83 45 55.0
Highland-Clinton county line.....	39 15 49.9	83 46 59.4
Road east.....	39 16 46.6	83 46 21.8
Bridge T. road north at.....	39 17 23.2	83 45 55.6
Intersection of roads.....	39 18 22.9	83 44 45.6

Geographic positions along the Baltimore & Ohio Southwestern Railroad.

Station.	Latitude.	Longitude.
	° ' "	° ' "
Road crossing under trestle.....	39 19 14.8	83 45 12.8
Farmer's Station, Main street crossing.....	39 19 13.9	83 45 48.9

Geographic positions along highways.

Stations.	Latitude.	Longitude.
	° ' "	° ' "
Bridge crossroads	39 20 16.3	83 45 34.3
Farmers' Station, crossroads 3 miles north of	39 21 15.4	83 45 33.9
Church, T. road northeast at.....	39 21 59.0	83 46 11.0
Lane southeast.....	39 22 46.4	83 45 55.5
T. road southwest.....	39 23 29.3	83 44 55.0
T. road northeast.....	39 24 08.2	83 45 19.4
New Antioch, T. road northeast of church in west part of	39 24 32.0	83 44 56.0
Union schoolhouse, T. road southwest near.....	39 25 53.4	83 44 11.0
T. road southwest.....	39 26 31.9	83 44 53.0

ALLEN AND AUGLAIZE COUNTIES.

(Lima Quadrangle.)

This line was run by Mr. J. R. Ellis and starts from adjusted position at Kemp station and follows south along public highways to southwest corner of quadrangle, thence east on public highways along south border of quadrangle to Sante Fe, thence north on public highways to adjusted position at Westminster station.

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
Kemp station of railroad 267° 26'.....	40	43	25.6	84	13	27.6
Kemp station, crossroads .5 mile south of.....	40	42	52.9	84	13	23.3
T. 4 S., Rs. 5 and 6 E., corner secs. 7, 12, 13, and 18....	40	42	01.9	84	13	22.7
T. 4 S., Rs. 5 and 6 E., corner secs. 13, 18, 19 and 24....	40	41	09.6	84	13	22.3
T. road west.....	40	49	17.4	84	13	21.9
T. 4 S., R. 6 E., $\frac{1}{4}$ corner between secs. 29 and 30....	40	39	51.6	84	12	13.0
Hume, crossroads .5 mile south of.....	40	39	12.2	84	12	12.4
T. 5 S., R. 6 E., corner secs. 5, 6, 7, 8.....	40	37	41.4	84	12	11.9
T. 5 S., R. 6 E., corner secs. 7, 8, 17 and 18.....	40	36	48.8	84	12	11.2
T. road east.....	40	35	56.3	84	12	10.7
T. 5 S., R. 6 E., $\frac{1}{4}$ corner between secs. 19 and 20....	40	35	29.9	84	12	10.4
Wapakoneta, crossing of Blackhoof and Auglaize streets at.....	40	34	14.6	84	11	46.2
Wapakoneta, Pipua pike at crossroads 1 mile south of.	40	33	18.8	84	11	55.7
Schoolhouse, crossroads at.....	40	32	00.2	84	12	09.3
T. road west.....	40	31	07.7	84	12	09.1
Schoolhouse, road east, 1-3 mile north of.....	40	30	41.3	84	12	13.0
Church, crossroads 1-5 mile north of.....	40	29	48.8	84	12	37.0
Cincinnati, Hamilton and Dayton Railroad, at east and west crossing.....	40	29	48.9	84	11	17.5
T. 6 S., R. 6 E., corner secs. 21, 22, 27 and 28.....	40	29	49.3	84	09	51.5
T. 6 S., R. 6 E., corner secs. 22, 23, 26 and 27.....	40	29	49.7	84	08	42.6
T. 6 S., R. 6 E., corner secs. 23, 24, 25 and 26.....	40	29	50.6	84	07	34.2
T. 6 S., Rs. 6 and 7 E., corner secs. 19, 24, 25 and 30....	40	29	51.9	84	06	25.6
T. 6 S., R. 7 E., corner secs. 19, 20, 29 and 30.....	40	29	51.6	84	05	17.1
T. 6 S., R. 7 E., corner secs. 20, 21, 28 and 29.....	40	29	51.7	84	04	08.3
T. 6 S., R. 7 E., corner secs. 21, 22, 27 and 28.....	40	29	51.7	84	02	59.8
T. 6 S., R. 7 E., corner secs. 22, 23, 26 and 27.....	40	29	51.6	84	01	51.3
T. 6 S., R. 7 E., corner secs. 23, 24, 25 and 26.....	40	29	51.5	84	00	42.9
Santa Fe crossroads at.....	40	29	28.4	83	59	37.7
Santa Fe, T. road west $1\frac{1}{2}$ miles north of.....	40	30	43.8	83	59	37.8
T. 6 S., Rs. 7 and 8 E., corner secs. 7, 12, 13, 18....	40	31	40.3	83	59	37.9
T. 6 S., Rs. 7 and 8 E., corner secs. 1, 6, 7 and 12....	40	32	32.7	83	59	37.8
Ts. 5 and 6 S., Rs. 7 and 8 E., corner secs. 1, 6, 31 and 36.....	40	33	25.2	83	59	37.7
T. 5 S., Rs. 7 and 8 E., corner secs. 25, 30, 31 and 36	40	34	17.4	83	59	37.8

Station.	Latitude.			Longitude.		
	°	'	"	°	'	"
T. 5 S., Rs. 7 and 8 E., corner secs. 19, 24, 25 and 30...	40	35	09.8	83	59	37.9
T. 5 S., Rs. 7 and 8 E., corner secs. 13, 18, 19 and 24....	40	36	02.1	83	59	38.0
Ts. 5 S., Rs. 7 and 8 E., corner secs. 7, 12, 13 and 18.....	40	36	54.3	83	59	38.2
T. 5 S., Rs. 7 and 8 E., corner secs. 1, 6, 7 and 12....	40	37	46.6	83	59	38.4
Ts. 4 and 5 S., Rs. 7 and 8 E., corner secs. 1, 6, 31 and 36.....	40	38	38.7	83	59	38.5
Ts. R. 4 and 5 S., Rs. 8 E., corner secs. 5, 6, 31 and 32	40	38	39.1	83	58	31.7
T. 4 S., R. 8 E., corner secs. 29, 30, 31, 32.....	40	39	31.4	83	58	32.2
T. 4 S., R. 8 E., corner secs. 19, 20, 29, 30.....	40	40	23.6	83	58	32.6
Westminister, T. road east at.....	40	41	35.9	83	58	47.4
Westminister, T. road north 1 mile northwest of....	40	42	05.8	83	59	38.6
Westminister station of railroad 276° 41'.....	40	42	57.2	83	59	35.3

APPENDIX F

ELEVATIONS OF PERMANENT BENCH MARKS AND OTHER POINTS IN OHIO, REFERRED TO MEAN SEA LEVEL AT SANDY HOOK, NEW YORK.

The elevations in the following lists are in accordance with the latest adjustment of the United States Coast and Geodetic Survey; namely: that made in the spring of 1903, and replace all elevations heretofore published for Ohio by the United States Geological Survey in the 21st, 20th, 19th and all prior annual reports, and in Bulletin No. 185, issued in 1901.

ATHENS AND IRONTON DATUM.

JACKSON, SCIOTO, LAWRENCE AND GALLIA COUNTIES.

(Hamden, Oak Hill, Scioto, Greenup, Ironton, Gallipolis and Point Pleasant Quadrangles.)

The elevations in the following list were published in the Appendix to the 19th Annual Report of the U. S. Geol. Survey, and are now based upon a bench mark of the transcontinental line of precise levels of the United States Coast and Geodetic Survey at Hamden postoffice, the elevation of which by the 1903 adjustment is 706.380 feet above mean sea level, and upon the bench mark of the United States Army Engineers at Point Pleasant, W. Va., and upon bench mark "314 A" of the same bureau at Catlettsburg, Ky., the elevation of the latter being 548.690 feet above mean sea level. A correction of 1.101 feet has been subtracted from the elevations as previously published, excepting that the line, Hamden Junction via Oak Hill crossing to Point Pleasant has been lowered .285 foot at Hamden, 1.101 feet at Oak Hill crossing and .925 foot at Point Pleasant. The corrections for intermediate points having been interpolated.

Those bench marks which were set in 1897 were marked with the letter "I" referring to Ironton as datum. Those set in 1898 were marked with the letter "A," referring to Athens, of the transcontinental line, as the permanent datum. The marking of bench marks set in 1897 and stamped "I" is approximately 2 feet lower than the present published and accepted heights of the same and those set in 1898 and marked "A" are 1 foot higher.

All of the above spirit leveling was done under the direction of Mr. Hersey Munroe, topographer, by Mr. E. L. McNair, levelman.

	FEET.
HAMDEN JUNCTION VIA WELLSTON TO BERLIN, ALONG BALTIMORE AND OHIO SOUTHWESTERN RAILWAY.	
Hamden station, .5 mile east of: bench mark LIII of the United States Coast and Geodetic Survey's transcontinental lines of precise levels, B. & O. So. Western R. R. on coping of small drain or culvert, cut.....	706.380
Wellston, First National Bank building, on the southwest corner of Broadway and Ohio Avenue, in foundation stone, left corner entrance to, bronze tablet marked "731 A".....	730.462
BERLIN TO BURRIS, ALONG CINCINNATI, HAMILTON AND DAYTON RY.	
Burris station, 2,000 feet west of: 10 feet north of east and west highway, in sandstone ledge, bronze tablet marked "702 A".....	701.696

FEET.

BURRIS, VIA ROCKY HILL TO MADISON FURNACE, ALONG CINCINNATI, HAMILTON AND DAYTON RY.

Madison station, 575 feet north of: in rock cut on curve about 8 feet west of center of Cincinnati, Hamilton and Dayton Ry., near south end of cut, bronze tablet marked "688 A"..... 686.598

MADISON FURNACE TO GALLIA, ALONG CINCINNATI, HAMILTON AND DAYTON RY.

Oak Hill, about 1 or 1.5 miles east of the Baltimore and Ohio Southwestern Railway, Madison township: 25 feet west of Cincinnati, Hamilton and Dayton Ry., 15 feet north of highway at Oak Hill crossing, iron post 4 inches above ground, marked "695 I"..... 697.951

GALLIA, VIA HOADLEY AND OLIVE FURNACE TO HALES CREEK.

Gallia, store and postoffice, northwest corner of building, between doors of post-office and telegraph office, north side of building, 19 feet from northwest corner, in sandstone water table, bronze tablet marked "657 I"..... 659.376

Greenfield township, sec. 31, on land belonging to Lloyd heirs, 1,200 feet from house of Mrs. Jenkins, in sandstone ledge in field, copper bolt marked "884 I"..... 886.573

HALES CREEK VIA MONROE FURNACE (ESTHER POSTOFFICE) TO MABEE.

Esther postoffice, 1.4 miles northeast of: 1.9 miles northeast of Monroe station, on B. & O. Southwestern Ry., in the northern half of northeast quarter of section 29, Jefferson township: 140 feet east of or right of highway, .25 mile north of water tank on coal railway, in face of sandstone ledge, bronze tablet marked "803 I"..... 804.873

MABEE TO BRUSHY FORK OF LITTLE SCIOTO RIVER.

Schoolhouse, district No. 12, Madison township, 120 feet northwesterly from: 225 feet right or east of road, 75 feet higher than road, in sandstone ledge on hillside, bronze tablet set horizontally in, marked "678 I"..... 680.956

MABEE VIA GRAHAMSVILLE AND CAMBA, TO CLAY.

"Freedmen Church," Franklin township: between the two front doors of, set horizontally in center foundation stone, bronze tablet marked "739 I"..... 741.857

Clay, .75 mile east of: on road to Madison Furnace: district schoolhouse No. 3, Madison township, in foundation stone under southwest corner, bronze tablet marked "745 I"..... 747.674

HALES CREEK VIA SOUTH WEBSTER AND WAIT, TO SCIOTOVILLE.

Hales Creek station and postoffice, on north side of road about .25 mile west of: on land belonging to Mrs. Gertrude Kuhner, 64 feet above level of road, in extreme west end of perpendicular sandstone bluff about 50 feet high, copper bolt marked "714 I"..... 716.085

Scioto Furnace station, 1,900 feet southwest of: on side hill in partly wooded lot of Scioto Furnace company, 125 feet south of and 30 feet higher than road, in sandstone boulder, copper bolt marked "647 I"..... 649.735

Sciotoville, front of two-story brick schoolhouse, in face of stone door sill, bronze tablet marked "546 I"..... 548.794

SCIOTOVILLE VIA HARRISONVILLE (SCIOTO POSTOFFICE) TO FLAT.

Harrison township, .5 mile south of top of hill opposite John Niner's home, in sandstone ledge 8 feet right or east of center of road, (road in narrow ravine), copper bolt marked "788 I"..... 790.045

Harrisonville (Scioto postoffice), southwest corner of Knights of Pythias two-story frame building, in sandstone foundation under, on west side of street, bronze tablet marked "654 I"..... 656.893

	FEET.
Scioto postoffice, and Flat postoffice, on main pike road between, Madison township, sec. 8, in sandstone foundation under southwest corner of Baptist church, bronze tablet marked "665 I"	667.295
FLAT VIA GALFORD TO GERMANY.	
Germany, in stone foundation under northwest corner of German Lutheran church, bronze tablet marked "675 I"	677.051
FLAT TO GRAHAMSVILLE.	
Flat, in front of residence of E. V. Samson, north side of street, in stone lamp and hitching post, bronze tablet marked "732 I"	734.120
Flat, 5.25 miles east of: on road to Grahamsville: 375 feet west of road crossing and small bridge over stream, Scioto township, 7 feet north of center of road, in sloping fence of sandstone ledge, bronze tablet marked "642 I"	644.091
SCIOTOVILLE TO WHEELERSBURG.	
Wheelersburg, in foundation sandstone under southwest corner of Baptist Church, bronze tablet marked "561 I"	562.866
WHEELERSBURG EAST TOWARD CHAFFIN'S MILLS.	
Porter township, in rear of district schoolhouse No. 7, 90 feet in rear and in a line with side of same, copper bolt marked "584 I"	586.777
WHEELERSBURG TO HAVERHILL.	
Pine Creek, at southwest corner of large iron bridge across: on freestone foundation, chiseled + ...	531.53
Haverhill, 1.6 miles northwest of: 8 feet north of north gatepost, entrance to Joshua Oakes & Sons' drain tile and red brick factory, in Greene township, Scioto county, 2.5 feet west of fence line on west of road, on top of iron post marked "546 I"	548.826
HAVERHILL, OHIO, VIA GREENUP, KENTUCKY, TO MOUTH OF WHETSTONE CREEK.	
Greenup, Greenup county building, set vertically in stone step at right of clerk's office, bronze tablet marked "538 I"	540.004
Greenup, 2.5 miles southwest of: 750 feet southwest of log house on north of road, sandstone boulder 7 by 10 by 25 feet, north of center of road, in south end of, bronze tablet marked "578 I"	580.081
HAVERHILL EASTWARD TO OLD OHIO FURNACE.	
Haverhill, 3.2 miles northwest of and about 500 feet back from brick store, 35 feet south of road, in sandstone ledge, copper bolt marked "619 I"	621.230
HAVERHILL TO Ironton.	
Hanging Rock, 2.6 miles northwest of: brick church (Ohio Baptist, 1864), in front of front door, in southeast corner of top step of three stone steps, copper bolt marked "551 I"	553.186
Ironton, northwest corner of Fourth and Railroad streets: in southeast corner of Memorial Hall and Public Library, bronze tablet	546.277
IRONTON VIA HECLA, ROCK CAMP AND ANDIS TO AID.	
Rock Camp, Perry township, 100 feet northeast of Union Hall: stone abutment of bridge over Crazy Creek, copper bolt marked "601 I"	603.483
AID VIA ARABIA AND SHERRITTS TO CAMPBELL.	
Aid postoffice, 2.5 miles from southeast corner of store of T. H. Neal: in sandstone boulder, copper bolt marked "581 I"	583.847

	FEET.
Symmes Creek, 1,035 feet west of bridge over, in large sandstone boulder, 15 feet long, copper bolt marked "622 I"	623.918
Sherritts, .75 mile north of: south bank of Johns creek, 430 feet southeasterly from wooden truss bridge over on land of J. M. Wiseman, in sandstone ledge, copper bolt marked "614 I"	616.432
CAMPBELL VIA ORT, CULBERTSON AND PEDRO TO HECLA.	
Campbell, .33 mile southwest of: at northeast corner of small wooden bridge, in sandstone foundation, copper bolt marked "687 I"	689.367
Pedro postoffice, .25 mile southwesterly of: 15 feet east of road in solid sandstone ledge, copper bolt marked "622 I"	624.806
OAK HILL, CROSSING VIA THURMAN, RIO GRANDE AND RODNEY TO GALLIPOLIS.	
Thurman schoolhouse, in foundation stone on side facing southwest, bronze tablet marked "696 A"	694.811
Rio Grande, north entrance to main building Rio Grande college, at right angle of steps, in sandstone wing wall, bronze tablet marked "682 A"	681.007
Rodney, 2 miles east of: in front door of brick house on north side of road, belonging to R. B. Waddell, in sandstone door sill, bronze tablet marked "671 A"	670.153
GALLIPOLIS VIA POINT PLEASANT, W. VA., TO LOCK NO. 11.	
Gallipolis, 1.5 miles north of courthouse: State Epileptic Hospital grounds: at southwest corner of women's dining room and chapel building, in foundation, third course of stone from pavement, bronze tablet marked "606 A"	604.908
Point Pleasant, W. Va., 100 feet west of Mason county courthouse, in west face of "Cornstalk" monument in yard, bronze tablet marked "570 A"	569.431
Lock No. 11, on United States Engineers' gage, 25 feet above zero	538.938

CANTON DATUM.

WAYNE, SUMMIT AND STARK COUNTIES.

(Canton, Massillon and Wooster Quadrangles.)

The elevations in the following list are based upon a bronze tablet marked "1062 Canton" in the southeast corner of the Stark county court house 4.5 feet above ground. The elevation of this is accepted as 1061.529 feet above mean sea level in accord with the Coast and Geodetic Survey adjustment of 1903 (see precise leveling). The circuits are tied at many points to bench marks of the precise level net set by the Geological Survey and Pittsburg, Fort Wayne and Chicago Railway.

The leveling was done in 1901 under the direction of Mr. Hersey Munroe, topographer, by Mr. James B. Maguire, levelman.

All permanent bench marks dependent on this datum are marked with the letters "CANTON" in addition to the figures of elevation.

The markings are in most cases 1 foot high due to error in primary levels check from Cleveland which was corrected in 1902 by precise leveling.

	FEET.
Canton, bridge No. 76, Pittsburg, Fort Wayne and Chicago Ry., railroad bench mark.....	1037.695
Canton, bridge No. 77, Pittsburg, Fort Wayne and Chicago Ry., east abutment of, on northwest corner, railroad bench mark.....	1029.160
Canton, Stark county courthouse: in southeast corner of, 4.5 feet above ground, bronze tablet marked "1062 CANTON".....	1061.529
LOUISVILLE, SOUTH AND WEST ALONG HIGHWAY VIA OSNABURG TO NORTH INDUSTRY.	
Louisville, .22 mile west of station: bridge No. 69, Pittsburg, Fort Wayne and Chicago Ry., over branch of Nimishillen creek, east abutment of, northwest corner of, bronze tablet marked "1097 CANTON".....	1097.420
Osnaburg, 340 feet north of Wheeling and Lake Erie Railroad crossing at Market street: 225 feet south of Liberty and 125 feet north of Walnut streets, culvert, in center of east wall of, bronze tablet marked "1146 CANTON".....	1146.222
MYERSVILLE (LAKE P. O.), ALONG HIGHWAY TO HARTVILLE AND THENCE ALONG WHEELING AND LAKE ERIE RAILROAD TO CANTON.	
Hartville, on north side of station: east window sill, on west end of.....	1164.43
Middle Branch, Wheeling and Lake Erie station: on west side of waiting room, on north end of door sill.....	1117.45
HARTVILLE, NORTH AND WEST ALONG HIGHWAY TO NEW BALTIMORE AND RETURN SOUTH AND EAST TO HARTVILLE.	
New Baltimore, .75 mile south of: on road from New Baltimore to Louisville, bridge over branch of Deer creek, on northeast corner of south abutment of, bronze tablet marked "1130 CANTON".....	1129.668

FEET.

POINT 1.2 MILES SOUTH OF MIDDLE BRANCH ALONG BERLIN-LOUISVILLE AND NEW BALTIMORE-LOUISVILLE ROADS TO LOUISVILLE.	
Louisville, highway bridge over branch of Nimishillen creek, 800 feet north of Pittsburg, Fort Wayne and Chicago R. R., on northeast corner of west wing wall of south abutment of.....	1107.07
NEW BERLIN, 2.5 MILES SOUTH OF, SOUTHWEST ALONG HIGHWAY TO MASSILLON.	
Massillon, City park, northwest corner of, on stone, bronze tablet marked "951 CANTON".....	949.867
MEYERSVILLE, SOUTHWEST AND SOUTH ALONG HIGHWAY, VIA NIMISILA CREEK AND CANAL FULTON TO MASSILLON.	
Nimisila, northeast corner of crossroads, on south wall surrounding Henry Dai- ley's house, in coping stone, bronze tablet marked "1112 CANTON"....	1110.966
Canal Fulton, stone highway bridge over Tuscarawas river, in center of north wall of, bronze tablet marked "954 CANTON 1901".....	952.944
MASSILLON WEST ALONG HIGHWAY VIA DALTON TO BURTON CITY.	
Dalton, Central hotel on Main street, on east line of, 1 foot inside curb line, on stone, bronze tablet marked "1102 CANTON".....	1100.932
BURTON CITY NORTH ALONG HIGHWAY TO MARSHALLVILLE.	
Marshallville, northeast corner crossroads at Union hotel, set in brown stone post, bronze tablet marked "1123 CANTON".....	1122.043
MARSHALLVILLE NORTH HIGHWAY TO EASTON AND NORTHWEST TO STIRLING.	
Easton, 400 feet east of Baltimore and Ohio R. R.: on road to Warwick 400 feet east of its intersection with road to Doylestown, in southeast corner of west abutment of bridge, bronze tablet marked "958 CANTON"....	957.373
Stirling, .75 mile east of the Erie station: southwest corner of east abutment of Erie railroad bridge over creek, in bridge seat, bronze tablet marked "964 CANTON".....	963.323
STIRLING WEST AND SOUTH ALONG HIGHWAY VIA CANAAN TO WOOSTER.	
Canaan, 400 feet west of crossroads: on road from Canaan to Congress, in south- east corner of west abutment of highway bridge, bronze tablet marked "1054 CANTON".....	1053.159
Wooster, 4.5 miles north of: .5 mile west of Madisonburg, at crossroads inter- section, set in east wall of culvert, bronze tablet marked "1109 CAN- TON".....	1108.032
Wooster University, on the south side of the observatory of, in water table, alu- minum tablet marked "1084 CANTON".....	1083.330
BETWEEN BURTON CITY AND WOOSTER SPUR LINES FROM PITTSBURG, FORT WAYNE AND CHICAGO R. R. BENCH MARKS.	
Smithville, 1 mile east of: on the Pittsburg, Fort Wayne and Chicago Ry., on the northeast corner of box culvert—railroad company's bench mark.....	1071.019
Smithville, 1 mile east of: 1 mile south of: highway bridge, on the southeast corner of the north abutment of, bronze tablet marked "1038 CANTON".....	1037.547
Orrville, 1.75 miles west of: on the Pittsburg, Fort Wayne and Chicago Ry., east abutment of culvert, northwest corner of.....	1037.953
East Union, 700 feet east of Cleveland, Akron and Canton R.R. crossing: high- way bridge over creek on State road, on the southwest corner of east abutment of, bronze tablet marked "1074 CANTON".....	1072.815

	FEET.
Orrville, Pittsburg, Fort Wayne and Chicago Ry. station: gentlemen's waiting room, east end of north door sill—railroad bench mark.	1059.258
Orrville, town hall: at front entrance, in water table, aluminum tablet marked "1066 CANTON".....	1064.627
Navarre, 3,870 feet north of station: on the Toledo division, north abutment of Wheeling and Lake Erie R. R. bridge, No. 142 A., in east end of, bronze tablet marked "916 CANTON".....	915.191
STIRLING NORTHWEST ALONG CLEVELAND, LORAIN AND WHEELING RAILWAY TO GRAFTON.	
Seville, 850 feet north of station, Cleveland and Lorain and Wheeling bridge over creek, in northwest corner of south abutment of, bronze tablet marked "987 CANTON".....	986.046
Chippewa Lake station, 2,000 feet north of: on the Cleveland, Lorain and Wheeling Ry., in south wing wall of west wall of culvert, bronze tablet marked "1036 CANTON".....	1035.448
Medina county courthouse, in northwest corner of: in water table, aluminum tablet marked "1093 CANTON".....	1091.937
Lester, 1,150 feet east of: on road running east from: west abutment of highway bridge, over Mallet creek, in the northwest corner of, aluminum tablet marked "934 CANTON".....	933.476
Belden, south abutment of Cleveland, Lorain and Wheeling Ry. bridge over highway, in the northwest corner of, bronze tablet marked "874 CANTON".....	873.693

CANTON AND CLEVELAND DATUM.

(Precise Leveling.)

CUYAHOGA, SUMMIT AND STARK COUNTIES.

(Cleveland, Akron and Canton Quadrangles.)

The elevations in the following list are the results of a line of precise leveling connecting the Lake Survey Gage bench mark at Cleveland with bench mark No. 77 at Canton of the Pittsburg, Ft. Wayne and Chicago Railroad between Pittsburg, Pa., and Lima, Ohio. This line and that of the railroad company were included in the precise level net adjusted in 1903 by the Coast and Geodetic Survey, and these elevations result from that adjustment which lowers the original elevation by this line 0.095 foot at Canton with respect to Cleveland. There has, therefore, been 0.095 foot correction distributed uniformly in proportion to the mileage. The total length of the line is 59.7 miles and the total divergence between the two simultaneous direct and reverse rodde lines is 0.076 foot.

The party outfit was similar to and the methods of leveling the same as that in previous use.

The leveling was done during part of October and November, 1902, by Mr. D. H. Baldwin, topographer in charge.

The permanent bench marks recovered on the Cleveland and Canton quadrangles were marked respectively with the letters "CLEVELAND" and "CANTON" and the figures of elevation obtained by the field results of the primary lines which are one foot too high to accord with the marking of the three tablets set by this line on the Akron quadrangle.

CLEVELAND SOUTH ALONG WHEELING AND LAKE ERIE: AKRON, BEDFORD AND CANTON: CLEVELAND, AKRON AND COLUMBUS AND CLEVELAND TERMINAL AND VALLEY RAILWAYS TO CANTON.		FEET.
Cleveland (U. S. Engineers' bench mark), south corner of Front and River streets, north corner of Johnson block, on corner stone of water table, chiseled cross	577.736	
Cleveland, (U. S. Engineer's water gage) zero mark which equals mean elevation of Lake Erie for years 1860 to 1875 inclusive	572.677	
Cleveland, mean elevation of Lake Erie for years 1886 to 1900 inclusive	572.153	
Cleveland, in front of Erie R. R. station: top of rail	602.6	
LINE CONTINUED ALONG WHEELING AND LAKE ERIE R. R.		
Cleveland, in front of Wheeling and Lake Erie station: top of rail	641.6	

	FEET.
Cleveland, grade crossing of Wheeling and Lake Erie Railway and Cleveland Terminal and Valley Railway, top of rail.	587.35
Cleveland, east corner of Independence street and E. Clark avenue: north corner of railroad bridge over canal and street, on fourth step of wing wall above avenue, chiseled square.	591.93
Newberg, in front of station, top of southwest rail.	780.7
Cleveland, grade crossing of Cleveland and Pittsburg and Wheeling and Lake Erie Railways, top of rail.	785.01
Cleveland, Miles avenue, crossing near station, top of rail.	849.25
Cleveland, Miles avenue, .84 mile south of station: northwest corner of girder bridge No. 15 over Akron, Bedford and Canton Electric Railroad, on coping stone of foundation, chiseled square.	822.72
Bedford, 2.16 miles northwest of: (R. R. bench mark), top of stone milepost "C 10"	906.50
Bedford, in front of Wheeling and Lake Erie station: top of rail.	946.0
Bedford, north corner of town hall: face of fourth course of foundation stones, from top, chiseled square.	949.64

LINE CONTINUED ALONG CLEVELAND AND PITTSBURG RAILROAD.

Bedford, in front of Cleveland and Pittsburg station: top of rail.	941.0
Bedford, 1.62 miles south of: grade crossing of Akron, Bedford and Canton and Cleveland and Pittsburg railroads, top of rail.	994.9
Macedonia, 1.52 miles north of: southwest corner of girder bridge over highway, on coping of stone foundation, chiseled square.	1038.76
Macedonia, southwest wing wall of girder bridge over road, in top of highest step, bronze tablet marked "1004 CLEVELAND".	1003.395

LINE CONTINUED WEST ALONG HIGHWAY TO NORTHFIELD, THENCE SOUTH ALONG AKRON, BEDFORD AND CANTON RAILROAD.

Little York, in front of station, top of rail.	973.2
Little York, 350 feet south of station: north end of arch wall east side of highway, chiseled square.	969.98
Town Line, in front of station: top of rail.	1037.7
Highland Springs, in front of station: top of rail.	1071.9
Chittenden, in front of station: top of rail.	1023.8
Seasons, in front of station: top of rail.	1011.1
Seasons, .27 mile south of: southeast corner of girder bridge, on coping stone of parapet wall, aluminum tablet marked "1002 CLEVELAND 1902".	1002.426
Wyoga, in front of station: top of rail.	1000.8
Puttrell, in front of station: top of west rail.	995.0
Springdale, in front of station: top of east rail.	993.2
Silver Lake Junction, in front of dispatcher's office: top of rail.	1023.1

LINE CONTINUED ALONG CLEVELAND, AKRON AND COLUMBUS R. R., TO EAST AKRON JUNCTION.

Silver Lake Junction, southwest end of large stone arch bridge over Cuyahoga river, on end coping stone of west side wall, aluminum tablet marked "1012 CLEVELAND 1902".	1012.197
Cuyahoga Falls, in front of station: top of rail.	1011.4
Cuyahoga Falls, .9 mile south of: southwest corner of arch bridge on corner of coping stone, chiseled square.	1005.09
East Akron Junction, northwest corner of stone arch bridge over Cleveland Terminal and Valley Railway, on top stone of wing wall, chiseled square.	963.73

	FEET.
LINE CONTINUED ALONG CLEVELAND TERMINAL AND VALLEY R. R. TO CANTON.	
East Akron, in front of station: top of rail.	981.5
East Akron, 520 feet south of station: north abutment of girder bridge, between tracks, on coping stone, aluminum tablet marked "983 CLEVELAND 1902".....	983.434
Krumroy, in front of station; top of rail.	1052.0
Myersville, 200 feet northeast of station: on northeast corner of high way bridge, southeast corner of foundation stone, bronze tablet marked "1076 CLEVELAND".....	1075.424
Myersville, in front of station: top of rail.	1073.5
Greentown, in front of station: top of west rail.	1107.9
New Berlin, about 400 feet east of Cleveland Terminal and Valley R.R. highway bridge over Nimisila creek, on northeast corner of west abutment, on coping stone, bronze tablet marked "1069 CANTON 1901".....	1067.880
New Berlin, in front of station: top of rail.	1067.7
New Berlin, 2.08 miles south of: west abutment of bridge No. 44, over brook, on foundation stone coping, chiseled square.....	1050.45
Canton, Cleveland Terminal and Valley Railway station: north side of door sill to women's waiting room, chiseled square.....	1032.03
Canton, in front of station: top of rail.	1030.4
Canton, (Pittsburg, Fort Wayne and Chicago R. R. B. M.), at bridge No. 77, on northwest corner of east abutment, chiseled square.....	1029.16

CINCINNATI DATUM.

The elevations in the following list are based on the permanent bench mark "T" established by the United States Coast and Geodetic Survey, consisting of a copper projection fixed in the west side of the court house building, on the north side of the south door, about 2 feet above pavement, the elevation of which was accepted as 546.537 feet.

All bench marks set in this district were marked "CIN," in addition to figures of elevation.

The leveling was done in 1898 by Mr. Ralph Stewart, levelman, under the general direction of Mr. Charles E. Cooke, topographer.

	FEET
Madisonville, Baltimore and Ohio Southwestern R. R. crossing Central avenue, east end of south abutment of plate girder bridge, first step from bottom, aluminum tablet marked "CIN 588".....	587.409
Cheviot, intersection Walnut street and Harrison pike: aluminum tablet marked "Cin 915".....	914.164
Cleves, township hall: foundation of northwest corner of: bronze tablet marked "CIN 499".....	498.264
Miamitown, large steel bridge across Miami river, top of south end of east abutment, bronze tablet marked "CIN 522".....	521.439
Barnesburg, on Blue Rock pike, 1.25 miles north of: south corner of foundation of German Evangelical church, aluminum tablet marked "CIN 863"...	862.673
Miamiville, Penna. R. R. bridge across Little Miami river: east end of north abutment, aluminum tablet marked "CIN 570".....	569.186
Mount Carmel, schoolhouse, coping southeast corner foundation: aluminum tablet marked "CIN 882".....	881.375
Ninemile Creek, steel bridge .5 mile south of junction of three forks, west end of north abutment, aluminum tablet marked "Cin 589".....	588.191
California city waterworks pumping station, east end of culvert nearest river running under driveway: aluminum tablet marked "Cin 487".....	486.693

CLEVELAND DATUM.

CUYAHOGA, SUMMIT AND LORAIN COUNTIES.

(Cleveland, Berea and Oberlin Quadrangles.)

The elevations in the following list are based upon an aluminum tablet marked "668 Cleveland 1901" in the west end of stone coping in front of Soldiers' Monument in public square, Superior street, Cleveland, Ohio. The elevation of this is accepted as 668.692 feet above mean sea level in accord with the Coast and Geodetic Survey adjustment of 1903.

The leveling was done in 1901 under the direction of Mr. R. D. Cummin, topographer, by Mr. Geo. Bailey, levelman.

All permanent bench marks dependent on this datum are marked with the letters "CLEVELAND" in addition to the figures of elevation.

CLEVELAND ALONG HIGHWAY EAST TO WARRENVILLE THENCE SOUTH TO MACEDONIA.

(Along streets and highways.)

FEET.

Cleveland, southwest corner of Front and East River streets, Johnson House block, northeast corner of, U. S. Engineers' bench mark—a cross (X) on water table.....	577.736
Cleveland, Lake Erie U. S. Engineer's water gage: zero mark which equals mean elevation of lake for years 1860-1875 inclusive	572.677
Cleveland, Lake Erie, by U. S. Engineer's water gage readings, mean elevation of lake for years 1886-1900 inclusive.....	572.153
Cleveland, Superior street, Soldiers' monument in public square, in front of, west end of coping, aluminum tablet marked "668 CLEVELAND 1901".....	668.692
Warrensville, brick schoolhouse, west end of, north face, in foundation 1 foot from ground, bronze tablet marked "1048 CLEVELAND 1901".....	1047.794
Bedford, 2.5 miles northeast of: red brick schoolhouse at intersection of five roads, left side of door, bottom step near wall, small square.....	1082.07

CLEVELAND VIA NORTH ROYALTON AND BOSTON TO MILLERS CORNERS.

Cleveland, Cincinnati, Chicago and St. Louis R. R. bridge over Cuyahoga river, southeast side of track, on east end of abutment, chiseled cross.....	592.26
North Royalton, Church of Christ, east face and about 2 feet from ground, in foundation, bronze tablet marked "1237 CLEVELAND 1901".....	1236.640
Boston, between Cuyahoga river and mill race to paper mill, southeast corner of masonry pier, bronze tablet marked "664 CLEVELAND 1901".....	663.815

WEST CLEVELAND VIA ROCKY RIVER, TRINITY POSTOFFICE AND BEREA TO
PARMA POSTOFFICE.

FEET.

Rocky River, 200 feet east of station: small New York, Chicago and St. Louis R. R. bridge over private road, southwest abutment of, in sill between girder and capstone and about 2 feet below rail, aluminum tablet marked "655 CLEVELAND 1901".....	654.865
Trinity, brick schoolhouse north of postoffice, front or west face of window sill south of doorway, aluminum tablet marked "696 CLEVELAND 1901".....	696.636
Berea, bridge over east branch of Rocky River, southeast wing of wall, about 2 feet above highway, aluminum tablet marked "769 CLEVELAND 1901".....	769.354
Parma, 1.25 miles southwest of, northeast end of bridge on the Cleveland-Medina turnpike, southeast side of road, in sill, aluminum tablet marked "846 CLEVELAND 1901".....	846.094

EAGLE CLIFF VIA LORAIN, NORTH AMHERST AND ELYRIA TO NORTH RIDGEVILLE.

Lorain, Erie street bridge over Black river, north side of street inside railing, west abutment of bridge, aluminum tablet marked "598 CLEVELAND 1901".....	598.346
North Amherst, .75 mile west of: east wall of Lake Shore and Michigan Southern R. R. bridge, in third course of stone 5 feet 4 inches from ground, in 8th stone from south end, bronze tablet marked "678 CLEVELAND 1901".....	678.623
Elyria, court house, in top of foundation stone at northwest corner of, aluminum tablet marked "721 CLEVELAND 1901".....	721.222

SOUTH AMHERST VIA OBERLIN AND GRAFTON TO FIELDS.

Oberlin, Severance chemical laboratory of Oberlin college (northwest corner of Lorain and Professor streets), in east wall of entrance to, 12 feet north of gate post and 2 feet above ground, aluminum tablet marked "817 CLEVELAND 1901".....	816.872
Grafton, .5 mile southwest of: highway bridge over east branch of Black river, in top of northeast wing wall of, bronze tablet marked "793 CLEVELAND 1901".....	793.611

PARMA VIA BENNETTS' CORNERS AND HARDCRABBLE TO CROSSROADS 3 MILES
EAST OF GRAFTON.

Bennetts' Corners, 1 mile from: on southwest corner of crossroads, in top of end of drain, bronze tablet marked "1058 CLEVELAND 1901".....	1058.088
Hardscrabble, 2 miles west of: bridge over stream to north, northwest abutment of, on northeast corner of mark.....	852.02
Hardscrabble, bridge over west branch of Rocky river, northeast sill of, bronze tablet in top of, marked "794 CLEVELAND 1901".....	794.657

COLUMBUS DATUM.

ROSS, VINTON, HOCKING, PICKAWAY, FAIRFIELD, FRANKLIN AND
LICKING COUNTIES.

(Chillicothe, Circleville, East and West Columbus Quadrangles.)

The elevations in the following list are based upon an aluminum tablet in Columbus court house marked "778 Columbus," the elevation of which by the 1903 adjustment is accepted as 777.295 feet above mean sea level. This height is derived from a line of precise levels run from the United States Coast and Geodetic Survey bench mark at Chillicothe.

The leveling was done in 1899 under the general direction of Mr. Hersey Munroe, topographer, by Mr. W. F. Hammond, levelman.

All bench marks dependent on this datum are marked with the letters "COLUMBUS" in addition to the figures of elevators.

CHILLICOTHE TO COLUMBUS VIA NORFOLK AND WESTERN RAILWAY.

	FEET.
Chillicothe, cut on pedestal of lamp post on the north side of the steps of the front entrance of the courthouse at, marked "Q:B.M.:U. S. C. & G. S., Aug. 5, 1879".....	638.182
Chillicothe, 5.6 miles north of: in southeast corner of bridge near crossroads, in bridge seat, bronze tablet marked "691 COLUMBUS 1899".....	690.983
Circleville, 4 miles south of: in north end west abutment covered bridge over Sippo creek, bronze tablet marked "707 COLUMBUS 1899".....	706.522
Circleville, 2 miles north of: in south end of west parapet wall of box culvert, aluminum tablet marked "693 COLUMBUS 1899".....	693.108
Ashville, .25 mile south of: in top stepstone north wall east end of railway bridge over Big Walnut creek, aluminum tablet marked "696 COLUMBUS 1899".....	696.082
Lockbourne, in top of south pier west end of Norfolk and Western railway bridge over Ohio canal, aluminum tablet marked "716 COLUMBUS 1899".....	715.493
Shadeville, 1.5 miles north of: on Spangler hill, 500 feet east of road, iron post set as triangulation point marked "817 COLUMBUS 1899".....	816.503
Columbus, in northwest corner of courthouse, below corner stone, aluminum tablet marked "778 COLUMBUS 1899".....	777.295
South Columbus, 2.5 miles southeast of: at Baker hill, iron post set as triangulation point, marked "819 COLUMBUS 1899".....	818.334
Columbus, 3 miles east of main bridge over Alum creek, in top of south wing of west abutment, aluminum tablet marked "760 COLUMBUS 1899".....	759.766
Reynoldsburg, bridge over Black Lick creek, in second step of south wing, west abutment, aluminum tablet marked "863 COLUMBUS 1899".....	862.306
Winchester, .5 mile south of: north abutment highway bridge over Little Walnut, in east end of bridge seat, aluminum tablet marked "758 COLUMBUS 1899".....	757.675

FEET.

Lithopolis, 1.5 miles south of: on county line road: in west wing south abutment of small highway bridge, aluminum tablet marked "COLUMBUS 886" 1899.....	888.410
Duval, 2.5 miles east of: in west end of north abutment of bridge over Little Walnut, aluminum tablet marked "711 COLUMBUS 1899".....	711.330
COLUMBUS, OVER NATIONAL PIKE VIA DARBY CREEK AND GEORGESVILLE TO GROVE CITY.	
Columbus, 3 miles northwest of: 400 feet north of Baltimore and Ohio Railroad, in top of west parapet wall of arch culvert on Sullivan pike, aluminum tablet marked "788 COLUMBUS 1899".....	788.064
West Jefferson, 1.75 miles east of: in first step of north wing east abutment of bridge over Big Darby creek, aluminum tablet marked "869 COLUMBUS 1899".....	868.545
Grove City, 4.5 miles west of: on bridge seat southeast corner of 10-foot bridge, chisel mark.....	887.404
Grove City, 4.5 miles east of: on southwest end of parapet wall southeast of bridge over Scioto river, chisel mark.....	705.84
GROVE CITY TO COLUMBUS.	
Urbancrest, south base: west Columbus sheet, marked "836 COLUMBUS 1899"	835.88
Columbus, 3.7 miles southwest of: north base of West Columbus sheet, marked "762 COLUMBUS 1899".....	762.07
Harrisburg, 3 miles north of: in west end of bridge seat, north abutment, bridge over Big Darby creek, aluminum tablet marked "813 COLUMBUS 1899".....	812.479
Harrisburg, 5 miles west of: southwest corner of Franklin county, in stone corner post, aluminum tablet marked "933 COLUMBUS 1899".....	932.745
Darby, .5 mile east of: west corner of small iron bridge, in bridge seat, aluminum tablet marked "903 COLUMBUS 1899".....	902.910
Commercial Point, in water table at southwest corner of school building, aluminum tablet marked "792 COLUMBUS 1899".....	791.570

FRANKLIN, MADISON, DELAWARE, UNION, MORROW, AND MARION COUNTIES.

(Dublin, Delaware, and Westerville Quadrangles.)

The elevations in the following list are based upon an aluminum tablet in the court house at Columbus, Ohio, Marked "778 Columbus." The elevation of this is accepted as 777.295 feet above mean sea level, derived from Coast and Geodetic Survey bench mark "Q" at Chillicothe the elevation of which as determined by the adjustment in 1903 of precise leveling is 638.182. The initial points upon which this leveling depends are bench marks on the East and West Columbus quadrangles, see Appendix to the 21st Annual Report U. S. Geol. Survey, which gives all previous work in this locality. The elevation there listed being lowered 0.300 feet.

The leveling on the Dublin and the Westerville quadrangles was done under the direction of Mr. Wm. H. Griffin, topographer, in 1901 and 1902, by Mr. C. H. Birdseye, levelman.

The leveling on the Delaware quadrangle was done in 1901 under the direction of Mr. Basil Duke, topographer, by Mr. Carleton McRae, levelman.

All permanent bench marks dependent on this datum are marked with the letters "COL," "COLS," and "C" in the Dublin, Westerville and Delaware quadrangles respectively in addition to the figures of elevation.

COLUMBUS NORTH ALONG HIGH STREET, WEST ALONG LANE AVENUE AND NORTH ALONG HIGHWAY NEAR SCIOTO RIVER TO DUBLIN.

Columbus, at northwest corner of courthouse, in lower corner stone, aluminum tablet marked "778 C" 777.295

TOLLGATE (NEAR DUBLIN) EAST VIA ELMWOOD TO WORTHINGTON.

Worthington, on south side of Grammar school building, in arch of foundation, over cellar window, aluminum tablet marked "884 C" 884.020

COLUMBUS, 3 MILES WEST OF: NORTHWEST ALONG SULLIVAN PIKE AND TOLEDO AND OHIO CENTRAL AND PITTSBURG, CINCINNATI, CHICAGO AND ST. LOUIS R. RS. TO MUDSOCK PIKE, 2 MILES SOUTH OF HILLIARD.

Columbus, 3 miles west of: 400 feet north of Big Four Ry. in top of wall of arch culvert, aluminum tablet marked "788 C" 788.064

HILLIARD, 2 MILES SOUTHWEST OF, WEST ALONG MUDSOCK AND ALTON-DARBY CREEK PIKES VIA MUDSOCK TO DARBY CREEK COVERED BRIDGE.

Darby Creek, in southeast abutment of covered bridge over: aluminum tablet marked "899 COL" 898.898

DUBLIN NORTHWESTERLY ALONG DELAWARE AND UNION COUNTIES AND MARYSVILLE PIKE TO NEW CALIFORNIA.

Dublin, at west end of steel bridge over Scioto river, in south stone wall, bronze tablet marked "805 COL" 805.261

NEW CALIFORNIA NORTHEAST ALONG DELAWARE AND PLAIN CITY PIKE TO BELLE POINT.	
New California, in southwest corner of foundation of Jerome township high school, aluminum tablet marked "993 COL"	993.461
NEW CALIFORNIA NORTH ALONG HIGHWAYS VIA WATKINS TO MILL CREEK BRIDGE AND THENCE EAST TO A POINT 3 MILES SOUTHWEST OF BELLE POINT.	
Watkins, 1.5 miles north of: in top of southwest abutment to covered bridge, bronze tablet marked "926 COL"	926.184
BELLE POINT EASTERLY ALONG HIGHWAYS TO STRATFORD.	
Belle Point, in northwest abutment to bridge over Mill creek, in top stone, bronze tablet marked "863 COL"	863.218
STRATFORD SOUTHERLY ALONG HIGHWAY VIA GREGORY AND LEWIS CENTER TO WORTHINGTON.	
Gregory, .5 mile east of: in southwest corner of foundation of brick schoolhouse, in subdivision No. 7, aluminum tablet marked "949"	949.198
EAST COLUMBUS ALONG CASSIDY FREE PIKE AND SUNBURY PIKE VIA PARKS MILLS TO POINT 3.7 MILES NORTH OF LATTER, THENCE EAST ALONG SUNBURY TO NEW ALBANY.	
Columbus, 3 miles east of: Main street bridge over Alum creek, top of south wing of west abutment of, aluminum tablet marked "760 COL 1899" ...	759.766
Parks Mills, covered bridge over Alum creek, southeast abutment 4th step from top, bronze tablet marked "773 COLMBS"	773.223
NEW ALBANY EAST 1.7 MILES THENCE SOUTH ALONG PUBLIC ROADS VIA OAKLAND CORNERS TO REYNOLDSBURG.	
Haven Corners, 1 mile east of: at crossroads in east wall of foundation of brick schoolhouse, bronze tablet marked "1022 COL"	1022.122
Reynoldsburg, bridge over Rocky Fork, in stone abutment on southwest corner aluminum tablet marked "863 COL, 1899" (stone containing tablet is in new position due to reconstruction of bridge abutment)	862.306
JUNCTION SUNBURY AND GRANVILLE PIKES, NORTH ALONG PUBLIC ROADS VIA WESTERVILLE AND AFRICA TO GREGORY SCHOOLHOUSE.	
Westerville, Association hall, Otterbein University, on northeast corner, in top stone of foundation, aluminum tablet marked "859 COL"	860.091
Africa, .25 mile west of: iron bridge over Alum creek, east abutment, in top stone of south wing wall, bronze tablet marked "831 COLS"	831.731
CHESHIRE EAST ALONG PUBLIC ROADS VIA ROME, SUNBURY TO VAN VALLEY.	
Sunbury, City hall: on northeast corner, in foundation, aluminum tablet marked "970 COLS"	970.266
Vans Valley, .1 mile south of: schoolhouse, at northwest corner, in top stone of foundation, aluminum tablet marked "1061 Cols"	1061.564
Centerville schoolhouse, subdivision No. 6, on northeast corner of foundation, corner stone, in top of, bronze tablet marked "1068 COLS"	1068.340
New Albany schoolhouse, in northeast corner stone of foundation, north side, aluminum tablet marked "1033 COLS"	1033.514
DELAWARE NORTH ALONG HIGHWAY ON EAST SIDE OF RIVER TO WATER HILL, THENCE EAST ALONG HIGHWAY TO ASHLEY AND SOUTHWEST VIA LEONARDSBURG TO DELAWARE.	
Delaware courthouse, on slab in front of statue, chisel mark	89.510

	FEET.
Delaware, 7.75 miles north of: in stone on west side of entrance to Marlborough church, bronze tablet marked "925 C".....	924.989
Leonardsburg, on stone steps of warehouse, bronze tablet marked "971 C"....	972.025
DELAWARE EAST ALONG BOWTOWN PIKE AND SOUTH RETURNING BY SUNBURY PIKE TO DELAWARE.	
Delaware City hall, on northwest steps of: bronze tablet marked "870 C"....	871.010
Delaware, 4.5 Miles east of: on Sunbury pike, north side of east abutment of steel culvert bridge, bronze tablet marked "897 C".....	897.539
DELAWARE (2 MILES NORTH OF), NORTH OF TROY CHAPEL, WEST TO RADNOR PIKE AND SOUTH TO MONNETT HALL, DELAWARE.	
Delaware, 5 miles north of: Troy Chapel, in stone entrance to, bronze tablet marked "942 C".....	942.428
DELAWARE, ALONG HIGHWAY WEST TO SCIOTO RIVER, THENCE NORTH ALONG WEST SIDE OF SAME AND EAST TO NORTON, THENCE SOUTH VIA TROYTON TO TROY SCHOOLHOUSE.	
Delaware, 5.25 miles west of: in north side of west abutment to bridge on Marysville pike, bronze tablet marked "871 C".....	871.338
Lybrand postoffice, 1 mile north of: on culvert 100 yards west of schoolhouse, aluminum tablet marked "928 C".....	928.257
(The above is on an unchecked spur from Warrensburg).	
MARLBOROUGH CHURCH WEST TO RADNOR, THENCE NORTH TO PROSPECT, THENCE EAST VIA WALDO TO WINDFALL CHURCH AND SOUTH TO WATER HILL.	
Radnor, township hall, near top step of; bronze tablet marked "937 C".....	937.610
Prospect, in west steps of City hall: aluminum tablet marked "908 C".....	909.244
Waldo, 2.5 miles northeast of: steel bridge over Olentangy river, north wing of east abutment, bronze tablet marked "940 C".....	940.732
PROSPECT WEST AND NORTH TO WOODLAND, THENCE EAST AND SOUTH TO PROSPECT.	
Woodland, in stone entrance to schoolhouse: bronze tablet marked "948 C"..	949.192

GRAFTON DATUM.

WASHINGTON COUNTY.

(Waverly and Parkersburg Quadrangles.)

The elevations in the following list are based upon Coast and Geodetic Survey bench mark "M" at Grafton, W. V., a chiseled square on the top of the north side of the central pier of the Baltimore and Ohio Railroad over Taggart's Valley Creek. The elevation of this as determined by that Bureau by the adjustment of 1903 of precise leveling is 999.855 feet above mean sea level.

The initial points upon which these levels depend are various bench marks of the Army Engineers (Ohio River Survey) and Coast and Geodetic Survey (transcontinental) precise level lines of the precise level net.

The leveling on the Waverly and Parkersburg quadrangles was done in 1902 under the direction of Mr. W. N. Morrill, topographer, by Mr. J. W. Hodges, levelman.

All permanent bench marks dependent on this datum are marked with the letters "GRAFTON" in addition to the figures of elevation.

WILLOW ISLAND, WEST VIRGINIA, NORTHEAST VIA NEWPORT TO BEVAN, THENCE
NORTHWEST VIA STEELRUN TO POINT 3 MILES NORTH OF STANLEYVILLE,
THENCE SOUTH ALONG CLEVELAND AND MARIETTA RAILROAD TO MARIETTA.

FEET.

Willow Island, 4 miles northeast of: 2.2 miles southwest of Newport, on southeast pier of highway bridge over Newell's Run, chiseled square.....	606.69
Steelrun Postoffice, 2 miles south of: southwest abutment of Bear Run bridge over Little Muskingum river, on coping stone, bronze tablet marked "641 GRAFTON 1902".....	640.397
Dye, 3 miles southeast of: at forks of road, on south foundation of small bridge, chiseled square.....	642.23
Stanleyville, 3.1 miles north of: 370 feet east of railway track, north of public highway, in face of a ledge of rock, bronze tablet marked "677 GRAFTON 1902".....	676.940
Marietta (new) courthouse: opposite postoffice, southeast corner in sill, aluminum tablet marked "616 GRAFTON 1902".....	615.930
MARIETTA WEST ALONG MARIETTA, COLUMBUS AND CLEVELAND RY. TO DUNBAR.	
Marietta, 2 miles south of: on northeast foundation of building west of track, chiseled square.....	629.19
Fleming, in north foundation of Wm. Thomas Fleming's dwelling: 150 feet southeast of postoffice and station, bronze tablet marked "796 GRAFTON 1902".....	796.348

	FEET.
Napier, in front of station: top of rail.....	801.
Napier station, north of track at overhead bridge, in face of rock, bronze tablet marked "803 GRAFTON 1902".....	802.672
DUNBAR SOUTH ALONG HIGHWAY VIA FILMORE TO LITTLE HOCKING.	
Dunbar, 3 miles south of: on southeast abutment of small bridge, chiseled square.....	747.96
Little Hocking, southwest abutment pier of Baltimore and Ohio bridge over Little Hocking creek, on top of, bronze tablet marked "619 GRAFTON 1902".....	619.05
Little Hocking, at: southwest foundation of Baltimore and Ohio Railway bridge over Little Hocking creek, chiseled square.....	623.566
NAPIER NORTH ALONG HIGHWAY NORTH TO BROWN'S MILLS, THENCE EAST TO WILLOW FARM, THENCE SOUTH ALONG OHIO AND LITTLE KANAWHA RAILROAD TO MARIETTA.	
Brown's Mills postoffice, 1 mile northeast of: W. J. M. Slottar's barn, in foundation stone, near center on south side, aluminum tablet marked "814 GRAFTON 1902".....	814.402
Brown's Mills, 13.3 miles northeast of: on top of northwest abutment of covered high bridge over Rainbow creek, bronze tablet marked "636 GRAFTON 1902".....	636.093

STEUBENVILLE DATUM.

COLUMBIANA, JEFFERSON, CARROLL, HARRISON, BELMONT AND MONROE
COUNTIES.

(Wellsville, Salineville, Steubenville, Cadiz, Scio, St. Clairsville, Barnesville and Clarington Quadrangles.)

The elevations in the following list are based upon an aluminum tablet at the southeast corner of the Jefferson county court house at Steubenville, Ohio, marked "716 Steubenville." The elevation of this is accepted as 714.729 feet above mean sea level and was determined from the Army Engineer's bench mark "67 A" on the water table of the same building, the elevation of which, in accordance with the Coast and Geodetic Survey adjustment of 1903 of precise leveling is 710.306 feet.

The initial points upon which this leveling depends include other bench marks of the Army Engineer's precise level line along the Ohio river the elevations accepted for which accord with said adjustment.

The leveling on the Wellsville and Salineville quadrangles was done in 1902 under the direction of Mr. Van H. Manning topographer, by Messrs. A. T. Bagley, and R. G. DeFrees, levelman.

The leveling of the Steubenville quadrangle was done in 1901 and 1902 under the direction of Messrs. W. T. Griswold and C. E. Cooke, topographers, by Messrs J. H. Wetzels and J. A. Buford, levelmen, respectively.

The leveling on the Cadiz, Scio, St. Clairsville and Barnesville quadrangles was done under the direction of Mr. W. T. Griswold, topographer, in 1901, by J. H. Wetzels, and in 1902, by B. J. Green, levelman.

The leveling on the Clarington quadrangle was done in 1902 under the direction of Mr. Wm. H. Griffin, topographer, by Mr. C. H. Birdseye, levelman.

All permanent bench marks dependent on this datum are marked with the letters "STBNVL" or "STEUBENVILLE" in addition to the figures of elevation.

EAST LIVERPOOL NORTH VIA CALCUTTA AND SPRUCEVALE TO CLARKSON.

FEET.

East Liverpool, (U. S. Engineer Corps bench mark 43 A), large rock opposite Jackson street, rock is 28 feet wide by 35 feet long, cut on.....	664.63
East Liverpool, City hall, on foundation stone, northwest corner of, aluminum tablet marked "731 STBNVL".....	731.205

FEET.

East Liverpool, River View cemetery, Soldiers' Memorial hall, on bottom step, at southeast corner.....	1239.69
Calcutta, southeast corner of Main street, 15 feet from Trollden store, at base of telephone pole, large rock, aluminum tablet marked "1108 STBNVL".....	1108.132
Clarkson, across street from Clarkson hotel: residence of Dr. Vale, in northwest corner of stone coping under walk, aluminum tablet marked "1193 STBNVL".....	1192.581
EAST LIVERPOOL WEST TO WELLSVILLE, THENCE NORTHWEST VIA WEST POINT TO ELKTON, THENCE EAST TO CLARKSON.	
Wellsville, City hall, corner 5th and Main streets, under second window from north on east side of building, in top of foundation, aluminum tablet marked "709 STBNVL".....	708.373
Wellsville, 3.5 miles north of: on Lisbon road, Highland town road to west, on northwest corner of front steps to Yellow Creek Presbyterian church, chiseled square.....	1203.18
West Point, in northwest abutment of iron bridge over Beaver creek, aluminum tablet marked "907 STBNVL".....	906.198
Elkton, bridge over Elk Run: last stone in northwest abutment of, aluminum tablet marked "898 STBNVL".....	897.744
WELLSVILLE ALONG ROAD AND CLEVELAND AND PITTSBURG RAILROAD VIA IRONDALE TO SALINEVILLE.	
Irondale, 400 feet south of C. & P. R. R. track, southeast abutment wagon bridge over Little Yellow creek, bronze tablet marked "717 STBNVL".....	716.968
Irondale, 7.15 miles north of: railroad bridge No. 41, 50 feet east of wagon road. 1000 feet west of coal tippie, in southeast abutment of bridge, chiseled circle.....	847.187
SALINEVILLE NORTHWEST ALONG CLEVELAND AND PITTSBURG R. R. TO KENSINGTON.	
Kensington, triangulation station, 1 mile southeast of Kensington, in top of marble post, bronze tablet marked "1375 STBNVL".....	1375.052
KENSINGTON EAST ALONG ROAD VIA LISBON TO ELKTON.	
Hanover, iron bridge over abandoned sandy canal, in northwest abutment of, chiseled circle.....	1134.10
Dungannon, in front step of St. Philip's Catholic church, chiseled circle.....	1171.34
Dungannon, 2 miles east of: in second step of Point Pleasant M. E. church, chiseled square.....	1068.17
Lisbon, Columbiana county courthouse: in north side of northeast corner of, bronze tablet marked "968 STBNVL".....	967.547
SALINEVILLE VIA BEREA CHURCH AND BERGHOLZ TO POINT 2.5 MILES SOUTH OF BERGHOLZ.	
Monroeville, .5 mile south of: at Elder triangulation station, bronze tablet marked "1388 STBNVL".....	1387.328
Bergholz, at schoolhouse: in southeast corner of foundation of, bronze tablet marked "924 STBNVL".....	923.852
Bergholz, 2.65 miles south of: on Amsterdam road at railroad crossing and forks of road to west, iron bridge 50 feet east of, bronze tablet marked "905 STBNVL".....	904.612

FEET.

HAMMONDSVILLE SOUTH ALONG ROADS VIA NEW SOMERSET TO KNOXVILLE.

Hammondsville, iron bridge on Wellsville road, northeast abutment of, chiseled circle.....	690.24
New Somerset, store and postoffice of N. C. Yeagley, in northeast girder stone, bronze tablet marked "1220 STBNVL".....	1219.414

BERGHOLZ WEST ALONG ROAD TOWARD HARLEM SPRINGS, THENCE NORTH TO CARROLLTON TRIANGULATION STATION.

Morgan Bridge, 2 miles west of, on Bergholz-Harlem road, .5 mile west of large brick house, at iron bridge, circle chiseled in northwest wing wall.....	917.75
Morgan Bridge, 2.5 miles west of, on Bergholz-Harlem road, 510 feet east of brick house at end of road, on iron bridge, circle chiseled in stone wall..	925.35
Morgan Bridge, 4.3 miles west of: near forks of roads, one northwest to Carrollton, other southwest up creek to Kilgore, iron bridge on road to Kilgore, 500 feet west of forks, on northwest wing wall of bridge, bronze tablet marked "958 STBNVL".....	957.580
Line follows road northwest, without entering Harlem Springs, to Carrollton triangulation station.	
Morgan Bridge, 5 miles west of: Harlem Springs, 2 miles east of, on center fork of road, .5 mile southeast of forks of road, iron bridge, circle chiseled on southwest wall.....	996.32
Harlem Springs, .1 mile northeast of: on Bergholz road, at forks of road north to Scroggsfield, forks of road southwest to Harlem, .25 mile west, 300 feet north of Bergholz road, on stone wall of wooden bridge on Scroggsfield road, circle cut in northeast wall.....	993.10
Harlem Springs, 3 miles north of: on Augusta road, at forks of road west to Carrollton road, old log house in southwest angle of corners, iron bridge 600 feet south of corners, circle cut in stone wall of.....	1065.50
Carrollton triangulation station, bronze tablet marked "1378 STBNVL".....	1377.234

CARROLLTON TRIANGULATION STATION EAST ALONG ROAD VIA SCROGGSFIELD TO BEREA CHURCH.

Scroggsfield, 1 mile east of: on Salineville road, at crossroads Bergholz-Mechanicstown road, and of Lake Erie, Alliance and Wheeling Railroad, 800 feet north of creamery, iron bridge, 10 feet west of, on southwest abutment of, bronze tablet marked "1025 STBNVL".....	1024.013
---	----------

LISBON SOUTH ALONG ROAD VIA GARVERS TO SALINEVILLE.

Lisbon, courthouse, north side of northeast corner of, bronze tablet marked "968 STBNVL".....	967.547
Lisbon, 3.7 miles south of: bridge over run, northwest abutment of, chiseled circle.....	1031.26
Garvers, .5 mile south of: road forks to west, south of crossroads, southwest abutment of iron bridge.....	985.84
Garvers, 2.5 miles south of: Salineville road, northeast corner of Geo. Patterson's house, in foundation, bronze tablet marked "1365 STBNVL"....	1364.871

EAST LIVERPOOL, OHIO, VIA FAIRVIEW, W. VA., TO NEW CUMBERLAND, WEST VIRGINIA.

Chester, 1 mile south of: .25 mile east of Locust Grove cemetery, Allison triangulation station, bronze tablet in top of marble post, marked "1337 STBNVL".....	1337.156
Fairview, on the north side of Tri-State Normal school, at base of stone frame to front door of, aluminum tablet marked "1196 STBNVL".....	1195.638

FEET.

New Cumberland, (U. S. Engineer Corps bench mark 56A) D. S. Schiller Foundry Co.'s works, southwest corner of, Front and Ferry streets, in west end of door stoop, chiseled square..... 670.66

STEUBENVILLE TO SKELLY.

Steubenville, southeast corner of courthouse: on third tier of foundation, aluminum tablet marked "715 STEUBENVILLE 1901"..... 714.580
 Mingo Junction, in front of station: top of rail..... 674.5
 Mingo Junction, bridge No. 46, on northwest coping stone of, chiseled square.. 670.31
 Steubenville, 4.4 miles southwest of: bridge No. 48, on northeast corner of coping stone of, chiseled square..... 675.84
 Gould station, in front of station: top of south rail..... 692.4
 New Alexandria, in front of station: top of south rail..... 740.7
 New Alexandria, .6 mile west of: on northwest abutment of small bridge, top stone, bronze tablet marked "STEUBENVILLE"..... 751.289
 Fernwood station, 600 feet east of: on north end of, arch culvert, railroad bench mark..... 777.14
 Fernwood station, 1.6 miles west of: bridge No. 52 over Cross creek, on northeast corner of coping stone, railroad bench mark..... 810.66
 Reed station, 390 feet east of: arch bridge No. 53 over Cross creek, on northeast coping stone of, railroad bench mark..... 828.47
 Reed station, 3300 feet west of: on bridge No. 56, northeast corner of coping stone, bronze tablet marked "STEUBENVILLE"..... 843.684
 Skelly, Iron wagon road bridge, in northwest wing wall of, on top stone, chiseled square..... 865.169

SKELLY VIA BLOOMFIELD AND UNIONDALE TO CADIZ JUNCTION.

Skelly, .9 mile west of: bridge No. 58 over Cross creek, on southwest coping stone of, chiseled square..... 888.114
 Unionport, road crossing, top of rail..... 968.96
 Unionport, 1200 feet west of: stone bridge over Cross creek, on northeast coping stone of, aluminum tablet marked "STEUBENVILLE"..... 975.554
 Miller, in front of station: top of rail..... 1025.1
 Cadiz Junction, road crossing, top of rail..... 1095.5
 Cadiz Junction, at intersection of Cadiz branch railroad with main line Pittsburgh, Cincinnati, Chicago and St. Louis Railroad, north side of wall on turn-table, on top stone of, bronze tablet marked "STEUBENVILLE". 1098.303

CADIZ JUNCTION TO CADIZ.

Falk station, road crossing, top of rail..... 1224.82
 Limestone station, in front of: top of rail..... 1222.3
 Conway, in front of station: top of east rail..... 1263.3
 Crawford, in front of station: top of west rail..... 1262.9
 Cadiz, north entrance to courthouse, first landing of stone steps, on west end of, aluminum tablet marked "1280 STEUBENVILLE"..... 1279.360

UNIONVALE SOUTHEAST VIA HURFORD, ADENA, ETC., TO DILLONVALE.

Adena, 1800 feet south of: iron bridge No. 198-A, on top stone of northwest abutment of, aluminum tablet marked "360 STEUBENVILLE"..... 859.376
 Dillonvale, 3300 feet north of: iron wagon bridge at intersection of roads, on southeast wing wall of, aluminum tablet marked "737 STEUBENVILLE"..... 736.530

DILLONVALE NORTH VIA SMITHFIELD AND BLOOMFIELD TO SKELLY.

Smithfield, water table on brick schoolhouse, on northwest corner of, aluminum tablet marked "1240 STEUBENVILLE"..... 1239.730

Bloomfield, water table on brick schoolhouse, on northwest corner of, aluminum tablet marked "1298 STEUBENVILLE"	1297.835
Skelly, iron wagon road bridge, northwest wing wall of, top stone of, chisel mark.....	865.17

CADIZ JUNCTION TO UNIONVALE.

Rexford, in front of station: top of rail.....	1139.0
Greenough, in front of station: top of rail.....	1092.4
Unionvale, 2400 feet east of station: bridge No. 193-A, on northwest bridge seat, bronze tablet marked "971 STEUBENVILLE"	970.707

SKELLY VIA RICHMOND, SPRINGFIELD, AMSTERDAM, JEFFERSON AND JEWETT, TO CADIZ JUNCTION.

Richmond, brick schoolhouse at south end of, on stone door step of, aluminum tablet marked "1286 STEUBENVILLE"	1285.138
East Springfield, public school building, on southeast corner of foundation stone of, aluminum tablet marked "1331 STEUBENVILLE"	1330.321
East Springfield, 4.5 miles northwest of: iron bridge over Yellow creek, on southwest wing wall of, bronze tablet marked "905 STEUBENVILLE"	904.637
Amsterdam, 3 miles south of: north side of schoolhouse, in top foundation stone of, aluminum tablet marked "1276 STEUBENVILLE"	1275.094

SMITHFIELD ALONG WARRENTON PIKE EASTWARD.

Smithfield, 5 miles east of: Mr. M. B. Cole's barn, on southeast corner of foundation of, aluminum tablet marked "1214 STEUBENVILLE"	1213.417
--	----------

CADIZ NORTHWEST VIA SMITHDALE TO STATION 45, THENCE NORTHEAST TO BOWERSTON.

Cadiz, 3.5 miles west of: on north side of road at corner of road to right, on stone culvert, chiseled square.....	952.26
Cadiz, 6 miles west of: (Stock township, Harrison county), John N. Haverfield's brick house, on front door step to, aluminum tablet marked "938 STEUBENVILLE"	937.024
Cadiz, 7.5 miles west of: 600 feet west of blacksmith shop, bridge at crossroad, on southeast abutment of, chiseled square.....	902.90
Cadiz, 11.7 miles west of: (Stark township, Harrison county), residence of J. W. McDivitt, on southeast corner foundation stone of, aluminum tablet marked "909 STEUBENVILLE"	908.586
Franklin, 2 miles west of: on northeast abutment of bridge, chiseled square...	871.67
Philadelphia road, .5 mile west of: Pittsburg, Cincinnati, Chicago and St. Louis R. R. stone arch bridge No. 86, northeast wing wall, on northeast coping of, aluminum tablet marked "868 STEUBENVILLE"	867.022
Bowerston, Pittsburg, Cincinnati, Chicago and St. Louis R. R. stone bridge No. 84, on northeast coping of, aluminum tablet marked "943 STEUBENVILLE"	942.569
McDivitt's residence, 11.7 miles west of Cadiz, south through Deersville to Poulston residence.	

(Single Spur Line.)

Deersville, 2 miles south of: residence of J. N. & H. T. Poulston, in southeast corner of foundation of, aluminum tablet marked "1189 STEUBENVILLE" (in Harrison county).....	1188.412
---	----------

STEUBENVILLE ALONG ROAD VIA WINTERVILLE TO RICHMONDVILLE.

Steubenville, in southeast corner of courthouse: aluminum tablet marked "715 STBNVL"	714.580
--	---------

FEET.

Winterville, in southeast corner of foundation of Winterville church, aluminum tablet marked "1256 STBNVL".....	1255.784
STEUBENVILLE ALONG ROAD VIA ISLAND CREEK CHURCH AND KNOXVILLE TO RICHMOND.	
Alikanna, stone abutment of foot bridge leading to waterworks, in southwest pier of, aluminum tablet marked "663 STBNVL".....	662.696
Island Creek bridge, across Island creek: 100 yards from road leading to Costonia, in southwest pier of bridge, bronze tablet marked "788 STBNVL".....	787.583
Knoxville, at west end of: in southeast corner of stone foundation of church, aluminum tablet marked "1280 STBNVL".....	1279.657
STEUBENVILLE SOUTHWEST VIA BRILLIANT AND NEW ALEXANDRIA TO SMITH-FIELD.	
Brilliant, railroad bridge over road, in southeast corner of bottom tier of stone, at northeast abutment of, T cut in stone.....	653.22
New Alexandria, in northeast corner of stone foundation of brick church, bronze tablet marked "1249 STBNVL".....	1249.130
WEST VIRGINIA.—CROSS CREEK BRIDGE NORTHEAST TO COLLIER'S, THENCE WEST TO HOLLIDAY'S COVE.	
Cross creek, third bridge over: opposite Wabash concrete bridge, southeast corner of, in stone abutment, chiseled cross.....	672.400
Colliers station, at northwest corner of bridge, in stone abutment of, aluminum tablet marked "824 STBNVL".....	823.597
Holliday's Cove, .5 mile east of: bridge marked "39" Pan-Handle railroad, in southeast corner, in coping stone, chiseled cross.....	741.90
HOLLIDAY'S COVE STATION NORTH TO NEW CUMBERLAND.	
Zalia, 100 feet south of church, on east side of road, opposite lower end of Toronto street at ferry, in big boulder, bronze tablet marked "704 STBNVL".....	703.720
NEW CUMBERLAND EAST TO CARSON'S OIL WELLS, THENCE SOUTHWEST TO HOLLIDAY'S COVE.	
New Cumberland, 3.25 miles east of: at northeast corner of bridge, T cut in stone.....	935.14
Comettsburg, southwest corner of Freshwater's house, bronze tablet marked "1150 STBNVL".....	1149.920
SCHOOLHOUSE ON CROSS CREEK VIA INDEPENDENCE, PA., TO WELLSBURG, WEST VIRGINIA.	
Colliersville, 5 miles south of: covered bridge, in southwest corner of abutment, cross cut in stone.....	754.58
Independence, Pa., 2.5 miles northwest of: bridge over Cross creek, in southeast corner of, aluminum tablet marked "784 STBNVL".....	784.024
Wellsburg, West Va., one mile east of: stone horse block in front of Jacobs's house, aluminum tablet marked "1001 STBNVL".....	1000.935
WHEELING, W. VA., ALONG CLEVELAND, LORAIN AND WHEELING RY. VIA BARTON AND FLUSHING, OHIO, TO FREEPORT, OHIO.	
Wheeling, U. S. Engineer bench mark No. 88-A, center of pedestal of Wheeling and Lake Erie Railroad bridge over Ohio river, pedestal is on west side of Pittsburg, Cincinnati, Chicago and St. Louis Ry. and between railroad and bridge pier.....	662.290

FEET.

Martin's Ferry, on east side of west pier of Martin's Ferry-Wheeling street-car bridge, 6 feet north of southeast corner of pier and 1½ feet off ground, B	
marked "U S"	651.489
M	
Bridgeport, south side of approach to Wheeling and Bridgeport bridge, on coping of, bronze tablet marked "662 STEUBENVILLE"	661.710
Wheeling creek, east side of: on north end of west abutment of bridge 217, chiseled square	656.303
Wheeling creek, at west end of Wheeling Creek station: on south end of bridge No. 214, west abutment, chiseled square	678.250
Wheeling creek, 1 mile west of: on south end of west abutment of bridge No. 213, chiseled square	688.187
Wheeling creek, 1.5 miles west of: on north end of east abutment of bridge No. 212, chiseled square	702.294
Blaine postoffice, Pasco station, east approach to stone bridge over Wheeling creek, on National road, on south wall of, chiseled square	726.59
Blaine, 1 mile west of: bridge No. 208, on south end of west abutment, tablet marked "742 STEUBENVILLE"	741.604
Blaine, 2.2 miles west of: 660 feet east of Barton tunnel, bridge No. 203, south side of west abutment, chiseled square	771.28
Barton, east end of: bridge No. 200, on south end of west abutment, chiseled square	791.80
Maynard, 1 mile east of: wooden covered county bridge over Wheeling creek, on north side of east abutment, on coping, aluminum tablet marked "842 STEUBENVILLE"	841.416
Maynard, 2.9 miles west of: bridge No. 185, just east of Fairpoint tunnel, on north end of west abutment of, chiseled square	887.83
Fairpoint, .5 mile east of: bridge No. 182, on north end of west abutment, chiseled square	899.993
Fairpoint, .8 mile west of: bridge No. 176, on north end of west abutment of, aluminum tablet marked "920 STEUBENVILLE"	919.770
Bannock, just west of: bridge No. 170, on north end of west abutment of, chiseled square	984.83
Lafferty, .5 mile west of: bridge No. 162, on north end of west abutment, bronze tablet marked "1032 STEUBENVILLE"	1031.343
Flushing, south side of Main street, Dr. Barricklow's dwelling, in north foundation wall of, aluminum tablet marked "1319 STEUBENVILLE"	1318.789
Piedmont, just east of railroad crossing at station on bridge seat at northwest corner of country bridge, bronze tablet marked "889 STEUBENVILLE"	889.105
Freeport, on south side of Main street, on door sill to entrance to bank of Freeport, aluminum tablet marked "1004 STEUBENVILLE"	1003.688
Tennett's tunnel, at north end of: at northwest corner of bridge No. 134, on top of stone, chiseled square	875.70
Tippecanoe, on southwest corner of Davies and Spencer streets, north foundation wall of dwelling on, bronze tablet marked "882 STEUBENVILLE"	881.394
TIPPECANOE EAST ALONG ROAD VIA MINKEVILLE TO BARNETTO BRIDGE.	
Tippecanoe, .8 mile east of: covered bridge over Brush Fork, on south wing wall of east abutment, chiseled square	869.29
Clendenning, postoffice, on east foundation wall of E. D. Clendenning's dwelling, bronze tablet marked "1091 STEUBENVILLE"	1090.890

FEET.

Barrett's schoolhouse, east end of top step of entrance to: bronze tablet in, marked "915 STEUBENVILLE"	914.693
ST. CLAIRSVILLE JUNCTION ALONG ST. CLAIRSVILLE AND NORTHERN RY. AND BALTIMORE AND OHIO RY. VIA ST. CLAIRSVILLE AND NEFF'S TO BENWOOD, WEST VIRGINIA.	
St. Clairsville, on east end of main entrance to courthouse, bronze tablet marked "1284 STEUBENVILLE"	1283.881
North Neff's, county bridge over Little McMahon's creek, on south end of west abutment, bronze tablet marked "733 STEUBENVILLE"	732.349
St. Clairsville Junction, just west of station, south end of east abutment of bridge No. 38, chiseled square	722.16
Neff's Siding, 2.1 mile west of: on center of west abutment of bridge No. 39 chiseled square	710.97
Bellaire, corner of Belmont and 32nd streets, on top step, under transom of City building, (on Belmont street), aluminum tablet marked "667 STEUBENVILLE"	667.639
Benwood, West Virginia, U. S. Engineers' bench mark "94-A," on east face of shore pier of Baltimore and Ohio railroad bridge over Ohio river from Bellaire to Benwood, pier is 40 feet west of Pittsburg, Chicago, Cleveland and St. Louis Ry., and mark is 95 feet north of south angle in face of pier, and level with surface in 1902, chiseled ledge	648.227
NEFF'S SIDING WEST ALONG BALTIMORE AND OHIO RAILROAD TO BARNESVILLE.	
Neff's Siding, 1 mile west of: stone arch bridge, on south side on coping of center of, chiseled square	749.44
Glencoe, just east of station: on northwest corner of west abutment of bridge No. 34, chiseled square	831.91
Warnock, just east of station: on north end of west abutment of bridge No. 30, bronze tablet marked "942 STEUBENVILLE"	941.465
Warnock, 1.8 miles west of: on north end of east abutment of bridge No. 28, near center, chiseled square	994.72
Belmont, on water tank, on south side of the Belmont National Bank building, aluminum tablet marked "1188 STEUBENVILLE"	1187.524
Barnesville, City building, on west side of Arch street, on south end of second step of entrance to, aluminum tablet marked "1270 STEUBENVILLE"	1269.823
Freeport, 7.9 miles south of: iron bridge over Skull Fork creek, on the Londonderry-Fairview road, on east end of south wing wall of east abutment, aluminum tablet marked "895 STEUBENVILLE"	894.983
Fairview, on south side of Main street, horse block in front of U. P. church, aluminum tablet on top of, marked "1237 STEUBENVILLE"	1236.523
Fairview, 2.3 miles south of: the crooked bridge, 1 mile west of Hendrysburg, near west end of bridge, on top of coping of south side, chiseled square ..	1097.48
Hendrysburg, 1.4 miles south of: at forks of National road and pike to Barnesville, at south end of small bridge, on top of stone across abutments, chiseled square	954.67
Barnesville, third house from east end of Baltimore and Ohio R. R. station: on north side of street, in front of, on top of curb, chiseled square	1244.32
PIEDMONT NORTHEAST ALONG COUNTY ROADS VIA ESTEP AND ELK RUN TO BUSHY FORK ROAD NEAR MINKSVILLE.	
Piedmont, 4.8 miles northeast of: Estep, .25 mile south of: north end of Beatty Carrothers's barn to right, on wing wall at center of, aluminum tablet marked "1264 STEUBENVILLE"	1263.383

ELK RUN TO BARRETT'S BRIDGE.

FEET.

Cassville, porch in front of postoffice and store building to north of road: on stone at southeast corner of, chiseled square.....1245.90

CONOTTON ALONG PUBLIC ROADS TO PERRYVILLE AND RETURN.

Perryville, near northeast corner of M. E. church: on south foundation wall, aluminum tablet marked "1272 STEUBENVILLE".....1271.081

CADIZ SOUTH ALONG ROAD TO FLUSHING.

Cadiz, 1.3 miles south of: 400 feet south of barn west of road, on bridge No. 25, chiseled square.....1073.66

WEST VIRGINIA.—BENWOOD SOUTH ALONG BELLAIRE, ZANESVILLE AND CINCINNATI RY. VIA SHADY SIDE TO WEE GEE STATION.

OHIO.

Wee Gee creek bridge, on southeast abutment to bridge: chiseled square..... 645.42

Key, .5 mile west of station: Robert McKelvey's residence, in top of foundation on northeast corner of house, aluminum tablet marked "1385 STBNVL" 1385.015

CAPTINA STATION SOUTH ALONG BELLAIRE, ZANESVILLE AND CINCINNATI RY. AND PUBLIC ROADS VIA ARMSTRONG, CRABAPPLE AND BEALSVILLE, TO CAMERON.

Armstrong Mills, .12 mile east of: wagon road bridge over Captina creek, at northeast corner of bridge floor, square cut in stone..... 770.43

Armstrong, .25 mile west of: in northeast corner of foundation of brick church, bronze tablet marked "806 STBNVL" 805.707

Cameron, Ohio, iron bridge over Sunfish creek, west end of south abutment, on top of stone supporting truss, bronze tablet marked "698 STBNVL" ... 698.231

CAMERON EAST ALONG PUBLIC ROADS VIA NIGGER RUN TO GRAYSVILLE.

Clarington, 2 miles west of: iron bridge over Nigger Run, southwest abutment, top stone of, cut on..... 633.61

Graysville, on railway bridge over Coon Run: (U. S. A. Engineer Corps bench mark "A-14"), on west wing wall of south abutment, 5 feet west of angle in wall and on step one stone lower than stone on which bridge truss rests..... 635.273

JACOBSTOWN NORTHWEST ALONG PUBLIC ROADS VIA KELSEY, CENTERVILLE TO BELMONT.

Kelsey, in front of station: top of rail.....1244.0

FROM A POINT 3 MILES SOUTHEAST OF BELMONT NORTHEAST ALONG PUBLIC ROADS VIA GALLOWAYS KNOB TO BALTIMORE AND OHIO RAILWAY BRIDGE NO. 31 AT MARBLETOWN.

Galloways Knob, 5 miles east of Belmont: in top of marble monument, bronze triangulation tablet.....1397.343

Marbletown, .12 mile north of Baltimore and Ohio Ry., iron road bridge, on top of stone of northwest abutment, chiseled square..... 912.43

KEY STATION NORTHEAST ALONG PUBLIC ROADS TO ANVIL POSTOFFICE.

(Single Spur Line.)

Bellaire, 5 miles southwest of: Myers Knob triangulation in top of monument, bronze tablet.....1360.063

CAMERON WEST ALONG SUNFISH CREEK ROAD TO COATES POSTOFFICE.

Cameron, schoolhouse, (brick), on lower projecting stone of northeast corner of foundation, cut..... 688.48

(Single Spur Lines.)

FEET.

Coates postoffice, Bellaire, Zanesville and Cincinnati Ry., 3.5 miles south-east of Woodfield, 500 feet east of railroad trestle, wagon bridge over Sun fish creek, southeast abutment, on top stone.....	854.07
DEXTER SCHOOLHOUSE (2 MILES EAST OF BEALLSVILLE) ALONG GERMAN RIDGE VIA GERMAN METHODIST AND GERMAN LUTHERAN CHURCHES TO POW-HATAN.	
Gale Knob, Beallsville triangulation station, 3 miles east of, Beallsville, on top of marble monument, bronze triangulation tablet.....	1414.940
Switzer, 1 mile east of: German Lutheran church, Switzer township, Monroe county, on north side, in foundation, east front of entrance, aluminum tablet marked "1291 STBNVL".....	1291.015
Powhatan Pt., .25 mile above: U. S. A. Engineer Corps bench mark "109-A" (Ohio River Survey), on west end of south abutment of Ohio River Railway bridge over Hog run.....	640.180
WHEELING, WEST VIRGINIA, ALONG CLEVELAND, LORAIN AND WHEELING RAILWAY, VIA BARTON AND FLUSHING, OHIO, TO FREEPORT, OHIO.	
Wheeling, U. S. Engineer bench mark No. 88A, center of pedestal of Wheeling and Lake Erie Railroad bridge over Ohio river, pedestal is on west side of Pittsburg, Cincinnati, Chicago and St. Louis railway and between railroad and bridge pier.....	662.290
Martin's Ferry, on east side of west pier of Martin's Ferry-Wheeling street car bridge, 6 feet north of southeast corner of pier and 1½ feet off ground, B marked "U S".....	651.42
M	
Bridgeport, south side of approach to Wheeling and Bridgeport bridge, on coping of, bronze tablet marked "662 STEUBENVILLE".....	661.607
Wheeling Creek, east side of; on north end of west abutment of bridge 217, chiseled square.....	656.24
Wheeling Creek, at west end of Wheeling Creek station; on south end of bridge No. 214, west abutment, chiseled square.....	678.19
Wheeling Creek, 1 mile west of; on south end of west abutment of bridge No. 213, chiseled square.....	687.93
Wheeling Creek, 1.5 miles west of; on north end of east abutment of bridge 212, chiseled square.....	702.25
Blaine postoffice, Pasco station, east approach to stone bridge over Wheeling Creek on National road, on south wall of, chiseled square.....	726.58
Blaine, 1 mile west of; bridge No. 208, on south end of west abutment, tablet marked "742 STEUBENVILLE".....	741.620
Blaine, 2.2 miles west of; 660 feet east of Barton tunnel, bridge No. 203, south side of west abutment, chiseled square.....	771.31
Barton, east end of; bridge No. 200, on south end of west abutment, chiseled square.....	791.91
Maynard, 1 mile east of; wooden covered county bridge over Wheeling Creek, on north side of east abutment, on coping, aluminum tablet marked "842 STEUBENVILLE".....	841.504
Maynard, 2.9 miles west of; bridge No. 185, just east of Fairpoint tunnel, on north end of west abutment of, chiseled square.....	888.07
Fairpoint, .5 mile east of; bridge No. 182, on north end of west abutment, chiseled square.....	900.28
Fairpoint, .8 mile west of; bridge No. 176, on north end of west abutment of, aluminum tablet marked "920 STEUBENVILLE".....	920.117

	FEET.
Bannock, just west of; bridge No. 170, on north end of west abutment of, chiseled square.....	985.18
Lafferty, .5 mile west of; bridge No. 162, on north end of west abutment, bronze tablet marked "1032 STEUBENVILLE".....	1031.709
Flushing, south side of Main street, Dr. Barricklow's dwelling, in north foundation wall of, aluminum tablet marked "1319 STEUBENVILLE".....	1319.166
Piedmont, just east of railroad crossing at station; on bridge seat at northwest corner of county bridge, bronze tablet marked "889 STEUBENVILLE".....	889.510
Freeport, on south side of Main street, on door sill to entrance to Bank of Freeport, aluminum tablet marked "1004 STEUBENVILLE".....	1004.109
Tennett's tunnel, at north end of; at northwest corner of bridge No. 134, on top stone, chiseled square.....	876.16
Tippecanoe, on southwest corner of Daviess and Spencer streets, north foundation wall of dwelling on, bronze tablet marked "882 STEUBENVILLE".....	881.863
TIPPECANOE EAST ALONG ROAD VIA MINKEVILLE TO BARNETTO BRIDGE.	
Tippecanoe, .8 mile east of; covered bridge over Brush Fork, on south wing wall of east abutment, chiseled square.....	869.75
Clendenning postoffice, on east foundation wall of E. D. Clendenning's dwelling, bronze tablet marked "1091 STEUBENVILLE".....	1091.342
Barrett's schoolhouse, east end of top step of entrance to; bronze tablet in, marked "915 STEUBENVILLE".....	915.135
ST. CLAIRSVILLE JUNCTION ALONG ST. CLAIRSVILLE AND NORTHERN RAILWAY AND BALTIMORE AND OHIO RAILWAY VIA ST. CLAIRSVILLE AND NEFF'S TO BENWOOD, WEST VIRGINIA.	
St. Clairsville, on east end of main entrance to courthouse, bronze tablet marked "1284 STEUBENVILLE".....	1283.903
North Neff's, county bridge over Little McMahon's creek, on south end of west abutment, bronze tablet marked "733 STEUBENVILLE".....	732.378
St. Clairsville Junction, just west of station; south end of east abutment of bridge No. 38, chiseled square.....	722.18
Neff's siding, 2.1 miles west of; on center of west abutment of bridge No. 39, chiseled square.....	710.99
Bellaire, corner of Belmont and 32nd streets, on top step under transom of city building (on Belmont street), aluminum tablet marked "667 STEUBENVILLE".....	667.944
Benwood, West Virginia, U. S. Engineer's bench mark "94A", on east face of shore pier of Baltimore and Ohio railroad bridge over Ohio river from Bellaire to Benwood, pier is 40 feet west of Pittsburg, Chicago, Cleveland and St. Louis Railway, and mark is 9.5 feet north of south angle in face of pier, and level with surface in 1902, chiseled ledge.....	648.227
NEFF'S SIDING WEST ALONG BALTIMORE AND OHIO RAILROAD TO BARNESVILLE.	
Neff's siding, 1 mile west of; stone arch bridge, on south side, on coping of center of, chiseled square.....	749.48
Glencoe, just east of station; on northwest corner of west abutment of bridge No. 34, chiseled square.....	831.97
Warnock, just east of station; on north end of west abutment of bridge No. 30, bronze tablet marked "942 STEUBENVILLE".....	941.547
Warnock, 1.8 miles west of; on north end of east abutment of bridge No. 28, near center, chiseled square.....	994.82
Belmont, on water tank, on south side of the Belmont National Bank building, aluminum tablet marked "1188 STEUBENVILLE".....	1187.657

FEET.

Barnesville, city building, on west side of Arch street, on south end of second step of entrance to, aluminum tablet marked "1270 STEUBENVILLE"	1270.028
Freeport, 7.9 miles south of; iron bridge over Skull Fork creek on the London-derry-Fairview road, on east end of south wing wall of east abutment, aluminum tablet marked "895 STEUBENVILLE"	895.327
Fairview, on south side of Main street, horse block in front of U. P. church, aluminum tablet on top of, marked "1237 STEUBENVILLE"	1236.793
Fairview, 2.3 miles south of; the crooked bridge, 1 mile west of Hendrysburg, near west end of bridge, on top of coping of south side, chiseled square	1097.73
Hendrysburg, 1.4 miles south of; at forks of National road and pike to Barnesville, at south end of small bridge, on top of stone across abutments, chiseled square	954.90
Barnesville, 3rd house from east end of Baltimore and Ohio railroad station; on north side of street, in front of, on top of curb, chiseled square	1244.52
PIEDMONT NORTHEAST ALONG COUNTY ROADS VIA ESTEP AND ELK RUN TO BRUSHY FORK ROAD NEAR MINKSVILLE.	
Piedmont, 4.8 miles northeast of; Estep; .25 mile south of; north end of Beatty Carrother's barn to right, on wing wall at center of, aluminum tablet marked "1264 STEUBENVILLE"	1263.806
ELK RUN TO BARRETT'S BRIDGE.	
Cassville, porch in front of postoffice and store building to north of road; on stone at southeast corner of, chiseled square	1246.07
CONOTTON ALONG PUBLIC ROADS TO PERRYVILLE AND RETURN.	
Perryville, near northeast corner of M. E. church; on south foundation wall, aluminum tablet marked "1272 STEUBENVILLE"	1271.081
CADIZ SOUTH ALONG ROAD TO FLUSHING.	
Cadiz, 1.3 miles south of; 400 feet south of barn west of road, on bridge No. 25, chiseled square	1073.69

TOLEDO DATUM.

LUCAS, WOOD AND OTTAWA COUNTIES.

(Toledo, Maumec Bay and Oak Harbor Quadrangles.)

The elevations in the following list are dependent on a bench mark established by the United States Coast and Geodetic Survey in 1899 at Toledo, Ohio, from a line starting at Gibraltar, Michigan, and running south to Cincinnati, Ohio. The bench mark is a copper bolt placed in the southwest side of the Government building at Toledo, Ohio, and lettered U. S. C. & G. S., the elevation of which by the 1903 adjustment is 603.889 feet above mean sea level.

The leveling was done by Mr. Dean Halford, levelman, under the direction of Mr. Charles E. Cooke, topographer.

Sylvania, .25 mile east of: on Monroe street, on east center of top tier of north abutment of culvert over north fork of Tenmile creek, bronze tablet marked "TOLEDO 639".....	FEET. 640.017
Sec. 8, T 3 of the Twelvemile Reservation, in southwest $\frac{1}{4}$ of: 2 miles west of Air Line Junction, on stone pike between Toledo and Holland, in top tier of center slot of culvert at south side of road, bronze tablet marked "TOLEDO 624".....	625.165
Sec. 17, T. 1, of Twelvemile Reservation, center of: on road leading north from Waterville to Monclova and .75 mile south of the Wabash railroad, on top pier at west end of north abutment of bridge over branch, bronze tablet marked "TOLEDO 639".....	640.405
Holland, .25 mile south of: on road to Monclova: on top tier at west end of north pier abutment of bridge over Wolf creek, bronze tablet marked "TOLEDO 617".....	617.563
Lime City, opposite schoolhouse, in northwest corner of foundation of church, bronze tablet marked "TOLEDO 647".....	648.045
Perrysburg, 1 mile south of: in top tier at east end of south pier abutment of bridge over Grassy creek, bronze tablet marked "636 Toledo".....	636.621
Walbridge, 1 mile west of: north end of west pier abutment of bridge over Cedar creek, bronze tablet marked "TOLEDO 619".....	619.497
Walbridge, .5 mile north of: in face of north pier abutment of bridge over Cedar creek, bronze tablet marked "TOLEDO 614".....	615.159
Sec. 26, T. 9 S., R. 8 E., in center of: 2.5 miles east of Ironville, bronze tablet marked "TOLEDO 587".....	587.713
Curtice, 1 mile south of: in west end of south pier of abutment of bridge over Crane creek: bronze tablet marked "TOLEDO 596".....	597.022
Genoa, 1 mile west of: at northwest corner of crossroads, on stone road, at northeast corner of culvert, bronze tablet marked "TOLEDO 626"....	626.558

FEET.

Genoa, 5.75 miles west of: on stone pike in south foundation of D. F. Mann's residence, bronze tablet marked "TOLEDO 634".....	634.329
Graytown, 3 miles north of: .25 mile south of corner of secs. 4, 5, 8, 9, T. 7 N., R. 14 E.: in east end of south pier abutment of bridge over Turtle creek, bronze tablet marked "TOLEDO 582".....	583.210
Genoa, 3 miles east of: in west end of north pier abutment of bridge over Toussaint creek, bronze tablet marked "TOLEDO 599".....	600.098
Sec. 13, 18, T. 7 N., on line between Rs. 14, 15, E., 600 feet south of creek road and .25 mile east of Daniel Muggy's house, in west end of north pier abutment of bridge over Toussaint creek, bronze tablet marked "TOLEDO 578".....	579.126
Lacarne, 1.5 miles west of: at corner of secs. 1, 6, 31, 36, at corner of Ts. 6, 7, N. and Rs. 15 and 16 E., on south side of road to Oak Harbor, in top tier of culvert, bronze tablet marked "TOLEDO 579".....	580.211
Oak Harbor, on east end of second tier of second abutment from north end of bridge over Portage river, bronze tablet marked "TOLEDO 581".....	581.945
Rocky Ridge, .75 mile south and .5 mile east of: on line between secs. 35 and 36, T. 7 N. R. 14 E., .25 mile north of road between Genoa and Oak Harbor, in west end of south pier abutment of bridge over branch, bronze tablet marked "TOLEDO 596".....	596.708

TOLEDO DATUM.

WOOD, SANDUSKY, ERIE, HURON, SENECA, LORAIN AND HANCOCK COUNTIES.

(Bowling Green, Elmore, Fostoria, Findlay, Fremont, Bellevue, Sandusky and Vermillion Quadrangles.)

The elevations in the following list are based upon Coast and Geodetic Survey bench mark "W" at Toledo, a copper bolt in the southwest side of the United States Custom House building marked "U. S. C. & G. S." The elevation of this by the adjustment of 1903, by that bureau, of precise leveling, is 603.889 feet above mean sea level. The initial points upon which these levels depend are other bench marks of the Coast and Geodetic Survey on the precise line from Grafton, Mich., to Cincinnati, Ohio, and this list is adjusted to accord with Cleveland datum through connection at Brownhelm station. For other elevations in this locality see Appendix to 21st annual report U. S. Geological Survey. The elevations there listed are to be increased 0.806 foot to accord with corrected datum.

The leveling here listed was done in 1901. The double rodded control line from Tontogany east to Old Woman Creek and remainder of work on Fremont, Bellevue and Sandusky quadrangles was done under the direction of Mr. Nat. Tyler, topographer, by Messrs. D. C. Witherpoon and A. C. Freundburg, levelmen.

The remainder of the work on the Bowling Green and Elmore, and all leveling on the Fostoria and Findlay quadrangles was done under the direction of Mr. C. E. Cooke, topographer, by Mr. J. A. Belford, levelman and Duncan Hannegan, topographer.

The continuation of the double rodded line to Brownhelm and remainder of work on the Vermillion quadrangle was done under the direction of Mr. C. W. Goodlove, topographer, by Mr. Dennis D. Doty, levelman.

All permanent bench marks dependent on this datum are marked with the letters "TOLEDO" in addition to the figures of elevation.

TONTOGANY TO OLD WOMAN CREEK 2 MILES WEST OF BERLIN HEIGHTS.

(Double Rodded Line.)

TONTOGANY ALONG CHICAGO, HAMILTON AND DAYTON R. R. TO BOWLING GREEN, THENCE ALONG PUBLIC ROAD TO NEW ROCHESTER.

Tontogany, Coast and Geodetic Survey bench mark, at southeast corner of Main and Broad streets, at west side of entrance to Waltz store "1894": northwest corner of iron plate under column, being top of a surface 78 inches square, chiseled mark..... 669.514

FEET.

Bowling Green, in southeast corner of courthouse yard: on top of a limestone post, a bronze meridian tablet marked "695 TOLEDO".....	695.477
ROLLERSVILLE ALONG NAPOLEON AND FREMONT ROAD VIA HELENA TO FREMONT.	
Helena, on east side of Weaver's store, near southeast corner, north side of road: aluminum tablet marked "699 TOLEDO".....	698.923
Helena, 2 miles east of: on south end of west abutment of iron bridge over Mud creek, about one foot south of iron bed plate, cross mark.....	665.48
Helena, 5.5 miles east of: southwest corner of iron bridge over creek on abutment 4 inches south of iron beam, cross mark.....	640.54
FREMONT TO CLYDE, THENCE NORTHEAST TO SECTION 34, TOWNSEND TOWNSHIP.	
Clyde, 2.5 miles west of: in northeast abutment of bridge over Bokee creek, at Maumee pike: aluminum tablet marked "637 TOLEDO".....	636.705
T. 5 N. R. 17 E., Sec. 34, Townsend township, on N. ridge road: at northeast corner of foundation of schoolhouse: aluminum tablet marked "678 TOLEDO".....	678.023
T. 5 N., R. 24 W., sec. 2, north side of: in face of abutment wall at southwest corner of bridge over creek, aluminum tablet marked "694 TOLEDO".....	694.117
Sand Hill postoffice, .5 mile west of: T. 5 N., R. 23 W., sec. 2, at northwest corner of white plastered brick church, in face of water table, aluminum tablet marked "734 TOLEDO".....	734.264
Prouts station, T. 5 N., R. 23 W., sec. 2, Oxford township: 500 feet east of Baltimore and Ohio Railroad tracks: in east wall at northeast corner of frame schoolhouse subdistrict No. 6, aluminum tablet marked "700 TOLEDO".....	700.229
PROUTS EAST THROUGH SPEARS CORNERS TO OLD WOMAN CREEK.	
T. 5 N., R. 22 W., sec. 2, near quarter corner south side of: .5 mile north of Avery, at Spears Corners, on west face at northwest corner of schoolhouse, in foundation about 1 foot above ground, bronze tablet marked "651 TOLEDO".....	650.689
FREMONT TO KINGSWAY.	
(Double Rodded Spur Line.)	
Fremont, in south face of jail wall, near southeast corner of building, 5 feet above ground, aluminum tablet marked "636 TOLEDO".....	635.949
T. 5 N., R. 15 E., secs. 2, 3, .5 mile from line between; 1.5 miles east of Kingsway, at crossroad; in foundation of north wall at northeast corner of Methodist church: aluminum tablet marked "588 TOLEDO".....	588.243
FOUR MILES NORTHEAST OF CLYDE TO BELLEVUE.	
Bellevue, at south corner of Bourdette hotel, in wall: aluminum tablet marked "751 TOLEDO".....	750.813
T. 5 N., R. 16 E. (Rilet township), sec. 13, south side of: in southeast abutment of bridge over Pickerel creek: bronze tablet marked "588 TOLEDO".....	588.399
PROUTS STATION NORTH THROUGH PERKINS TOWNSHIP TO SANDUSKY.	
T. 6 N., R. 23 W., sec. 3, northeast $\frac{1}{4}$ of southeast $\frac{1}{4}$ of: in water table at northwest corner of schoolhouse: aluminum tablet marked "616 TOLEDO".....	616.442
Sandusky, in south side of government building, in southeast corner: aluminum tablet marked "597 TOLEDO".....	597.372

AVERY SOUTH ALONG HIGHWAY VIA MILAN TO NORFOLK TOWNSHIP.

FEET.

T. 4 N., R. 22 W., sec. 3, in northern part of: 2 miles south of Milan, about 500 feet south of Huron-Erie county line: on top of south end of retaining wall of filled road over creek, bronze tablet marked "624 TOLEDO" 624.366

OLD WOMAN CREEK VIA BERLIN HEIGHTS, ASHMONT AND VERMILLION, TO BROWNHELM STATION ON LAKE SHORE AND MICHIGAN SOUTHERN R. R.

(Continuation of Double Rodded Line from Tontogany.)

Berlin Heights, 2 miles west of: iron bridge over Old Woman creek, on top of southeast abutment stone of, bronze tablet marked "608 TOLEDO". 607.961

Berlin Heights, corner of Main and Hotel streets, at southwest corner of stone window sill of Lippus and Fowler's store: bronze tablet marked "777 TOLEDO" 776.588

Shinrock, at northwest corner of C. Hoffman's store: aluminum tablet marked "627" 627.339

(The above bench mark is on small circuit to Old Woman creek.)

Ashmont, 700 feet east of station, 300 feet south of railroad, in southeast corner of wagon bridge: aluminum tablet marked "614 TOLEDO" 613.633

Vermillion, in window sill at southeast corner of Davis Brothers' store: aluminum tablet marked "595 TOLEDO" 594.695

Brownhelm, at south end of north side of railroad bridge 141: aluminum tablet marked "640 TOLEDO" 639.350

VERMILLION VIA AXTEL TO BIRMINGHAM.

(Double Rodded Line.)

Birmingham, on west abutment stone of bridge over Vermillion river, in south end of third stone from top and one foot from east edge: aluminum tablet marked "716 TOLEDO" 715.803

BERLIN HEIGHTS VIA COLLINS AND WAKEMAN TO BIRMINGHAM.

Collins, in west side of public school, in sill of center window: bronze tablet marked "899 TOLEDO" 899.458

Wakeman, at west end of bridge over Vermillion river, in second stone from top, at south side: aluminum tablet marked "861 TOLEDO" 861.158

WAKEMAN EAST ALONG HIGHWAY VIA KIPTON TO POINT 1.5 MILES WEST OF OBERLIN.

(The error distributed in this line is excessive.)

Kipton, brick building (store and postoffice), north corner of, in window sill, bronze tablet marked "857 TOLEDO 1901" 856.957

BOWLING GREEN NORTH ALONG ELECTRIC LINE TO ROCHTON.

T. 6 N., R. 10 E., sec. 25, southeast corner of: east side of electric railway, in west abutment at southwest corner of iron bridge over ditch, aluminum tablet marked "666 TOLEDO" 666.640

Bend station, at north end of switch: top of east rail 665.7

ROCHTON SOUTH ALONG CINCINNATI AND DAYTON R. R. TO TONTOGANY.

(Set from Coast Survey bench mark on same bridge.)

Hull Prairie, about 200 feet south of station: in southeast quarter of stone culvert, on first step below the bridge seat: aluminum tablet marked "660 TOLEDO" 660.575

TONTOGANY TO POINT 2 MILES SOUTH OF.

T. 5 N., R. 10 E., sec. 17, south side of: 2 miles south of Tontogany: in north end of west stone abutment to small iron bridge over ditch, aluminum tablet marked "674 TOLEDO" 674.739

BOWLING GREEN SOUTH ALONG ELECTRIC LINE TO MUNGEN.

FEET.

T. 3 N., R. 10 E., sec. 28, east side of, 2 miles west and .3 mile south of Ducat: in southwest corner of stone abutment at southwest corner of bridge over Middle Branch of Portage river, aluminum tablet marked "689 TOLEDO"..... 689.536

MUNGEN TO POINT 5.5 MILES EAST OF, THENCE NORTH TO NEW ROCHESTER.

T. 4 N., R. 11 E., sec. 30, south side of: .5 mile southeast of Mungen: in west stone abutment at southwest corner of bridge over Middle Fork of Portage river, aluminum tablet marked "689 TOLEDO"..... 689.385

NEW ROCHESTER NORTH AND EAST TO LUCKY.

T. 6 N., R. 12 E., sec. 19, east side of: 1 mile west and .5 mile north of Lucky, in north end of west abutment at northwest corner of iron bridge over ditch, aluminum tablet marked "649 TOLEDO"..... 649.151

T. 5 N., R. 12 E., sec. 11, east side of: 1 mile east of Pemberville, in north end of stone abutment at southeast corner of iron bridge over Portage river, aluminum tablet marked "644 TOLEDO" 643.840

ONE-HALF MILE WEST OF WOODSIDE TO 1.7 MILES EAST OF, THENCE SOUTH VIA BRAONER TO 1 MILE WEST OF RISING SUN AND WEST TO T. 4 N., R. 12 E., SOUTHWEST CORNER OF SEC. 30.

T. 4 N., R. 12 E., sec. 30, south side of: at southeast corner of wooden bridge over Portage river, in stone abutment, aluminum tablet marked "692 TOLEDO"..... 691.875

ONE MILE WEST OF RISING SUN TO POINT 5 MILES EAST OF, THENCE NORTH VIA GIRTON TO 1 MILE EAST OF ROLLERSVILLE.

T. 4 N., R. 12 E., sec. 26, southeast corner of: 1 mile west of Rising Sun, at northeast corner of crossroads, in center of stone in culvert, aluminum tablet marked "714 TOLEDO" 714.750

ROLLERSVILLE EAST 1 MILE, THENCE NORTH TO WOODVILLE.

Woodville, in southeast abutment on first step of bridge over Portage river: aluminum tablet marked "630 TOLEDO"..... 630.436

WOODVILLE EASTERLY AND SOUTH TO HELENA.

T. 5 N., R. 15 E., sec. 6: southeast corner, 1.5 miles northwest of Hessville, at Swartzman crossing on Fremont electric railway, at northeast corner of south side of culvert, aluminum tablet marked "636 TOLEDO".... 636.598

ONE MILE EAST OF HELENA SOUTH 5 MILES VIA MILLERSVILLE, THENCE WEST TO .7 MILE SOUTH OF GIRTON.

T. 4 N., R. 14 E., sec. 30, east side of, 3 miles south of Millersville, 2.3 miles north of Kansas: in southeast pier of iron bridge over creek: aluminum tablet marked "699 TOLEDO"..... 699.060

ONE-HALF MILE NORTH AND EAST OF BRADNER SOUTH VIA RISING SUN TO FOSTORIA.

(Double Rodded Line.)

Rising Sun, 1 mile south of: at junction of county and township lines, in southwest abutment of bridge over creek, chiseled cross..... 717.27

Langley, .8 mile south of: in southeast abutment of iron bridge over creek, aluminum tablet marked "736 TOLEDO"..... 736.698

TWO MILES SOUTH OF LANGLEY EAST 10 MILES AND NORTH VIA KANSAS 2 MILES NORTH OF SAME.

Bascom, 5.3 miles north of: Plum river, in southwest abutment of iron bridge over, aluminum tablet marked "725 TOLEDO"..... 725.425

	FEET.
Kansas, 1 mile south of: at southwest corner of road fork, in stone abutment, chiseled cross.....	730.38
FOSTORIA EAST TO BASCOM AND NORTH 5 MILES.	
Bascom, 5 miles north of: at southwest corner of road forks, in stone culvert, chiseled cross.....	728.39
BASCOM SOUTH 5.2 MILES, THENCE WEST 6.2 MILES, THENCE TO FOSTORIA.	
Bascom, .3 mile south of: south of cemetery, in southwest abutment of iron bridge over creek, aluminum tablet marked "766 TOLEDO".....	766.700
Bascom, 5.3 miles south of: 100 yards west of schoolhouse at crossroads, in northwest abutment of stone culvert over creek: aluminum tablet marked "805 TOLEDO".....	804.813
New Riegel, 1 mile north and 2 miles west of, at crossroads, in stone step of schoolhouse, chiseled cross.....	825.87
ONE MILE NORTH OF ALVEDA SOUTH 3.7 MILES, THENCE EAST TO ADRIAN AND NORTH VIA BURWICK TO 1 MILE NORTH AND EAST OF NEW RIEGAL.	
Alveda, 1 mile north of, at crossroads: in step of schoolhouse, chiseled cross...	837.19
Alveda, 2 miles south of: in stone in northwest abutment of iron bridge over creek, aluminum tablet marked "815 TOLEDO".....	814.976
3.4 MILES WEST OF FOSTORIA NORTHWEST 2.7 MILES, THENCE NORTH TO T. 4 N., R. 12 E., sec. 30.	
Bloomdale, 1.5 miles east of: T. 3 N., R. 12 E., sec. 31, in southeast abutment of iron bridge, aluminum tablet marked "740 TOLEDO".....	740.410
1.2 MILES EAST OF BLOOMINGDALE VIA BLOOMINGDALE TO GALATEA, THENCE NORTH VIA OIL CENTER TO MUNGEN.	
Bloomdale, on Main street: at northeast corner of hardware store, square cut in stone step.....	749.65
Oil Center, T. 3 N., R. 11 E., sec. 18, south side of: in northwest abutment of iron bridge over Rocky Ford: copper bolt marked "709 TOLEDO"....	709.026
GALATEA WEST VIA NORTH BALTIMORE TO 2.5 MILES WEST OF SAME.	
North Baltimore, 1.3 miles east of: in west side of door step to schoolhouse, chiseled cross.....	734.98
North Baltimore, .5 mile south of: T. 3 N., R. 10 E., sec. 35, in southeast abutment of bridge over creek, bronze tablet marked "726 TOLEDO".....	726.461
GALATEA SOUTHERLY TO FINDLAY.	
Findlay, in north front of courthouse, east of north entrance, aluminum tablet marked "779 TOLEDO".....	779.555
SEVEN MILES WEST OF ARCADIA VIA ARCADIA TO 5 MILES SOUTH OF SAME, THENCE WEST TO FINDLAY.	
T. 1 N., R. 11 E., sec. 24: 5.5 miles east of Findlay, in stone abutment at northeast corner of iron bridge over The Outlet, .5 mile east of its junction with Blanchard river: aluminum tablet marked "786 TOLEDO".....	785.787
FINDLAY WEST 5 MILES, THENCE NORTH AND EAST TO 1 MILE NORTH OF FINDLAY.	
T. 1 N., R. 10 E., sec. 21, 4 miles west of Findlay, in southeast corner of south abutment of iron bridge over small creek, aluminum tablet marked "771 TOLEDO".....	770.810

APPENDIX G

LIST OF MERIDIANS ESTABLISHED

APPENDIX G

MERIDIAN MARKS.

CANTON, STARK COUNTY, OHIO.

Location of station: On the Stark county fair grounds at Canton.

Station mark: A marble post 40 by 6 by 8 inches, set 36 inches in the ground, in the center of top of which is cemented a bronze meridian tablet. It is 25 feet north of inside fence at south end of race track.

Reference mark: Center of judges' stand, 390.6 feet distant; true azimuth, $148^{\circ} 01' 30''$.

Distant mark: A marble post 40 by 6 by 8 inches, set 36 inches in the ground, in the center of top of which is a bronze meridian tablet. It is 765 feet north of the station mark and 283 feet south of inside fence at north end of race track.

Center of judges' stand, $480\frac{1}{2}$ feet distant; true azimuth, $25^{\circ} 30' 00''$.

Resident referee: Mr. John S. Hoover, county surveyor.

ST. CLAIRSVILLE, BELMONT COUNTY, OHIO.

Location of station: Within the Belmont county Agricultural Society fair grounds.

Station mark: A sandstone post 40 by 12 by 20 inches set 40 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Distant mark: North of station 400 feet, a sandstone post 72 by 12 by 20 inches set 40 inches in the ground, in the center of top of which is cemented a bronze triangulation tablet.

WOOSTER, WAYNE COUNTY, OHIO.

Location of station: On the Wayne county fair grounds.

Station mark: A marble post 36 by 6 by 9 inches set 34 inches in the ground, in the center of top of which is cemented a bronze meridian tablet.

Reference marks: Center of judges' stand, 129 feet distant; true azimuth, $181^{\circ} 31'$; tree, 426 feet distant; azimuth, $104^{\circ} 00'$.

Distant mark: 539.4 feet north of station mark, 40 feet from inside edge of race track, a marble post 36 by 6 by 9 inches set 34 inches in

the ground, in the center of top of which is cemented a bronze meridian tablet.

Reference marks: Center of judges' stand, 413 feet distant; true azimuth, $356^{\circ} 25'$; tree, 601 feet distant; azimuth, $43^{\circ} 25'$.

Resident referee: County surveyor.

BOWLING GREEN, WOOD COUNTY.

Location of station: In southwest corner of court house grounds.

Station mark: A limestone post 36 by 7 by 5 inches, set 34 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference mark: West line of grounds, 21 feet; south line of grounds 12 feet.

Distant mark: North of station 352 feet, a limestone post 36 by 7 by 5 inches, set 36 inches in the ground, having a copper bolt cemented in its top.

Resident referee: County clerk.

DELAWARE, DELAWARE COUNTY.

Location of station: In western part of college grounds.

Station mark: A limestone post 36 by 6 by 6 inches, set 33 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference mark: Fountain bears S. 68° W., distance 69 feet; western line of college grounds 50 feet east.

Distant mark: North of station 480 feet, a limestone post 24 by 6 by 6 inches, set 24 inches in the ground, having a copper bolt cemented in its top.

Resident referee: Custodian of college buildings.

FINDLAY, HANCOCK COUNTY.

Location of station: In southeast part of college grounds.

Station mark: A sandstone post 36 by 6 by 6 inches, set 32 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference mark: Twenty-four feet from south fence, 15 feet from east fence, and 41 feet from water plug at corner.

Distant mark: North of station 525 feet, a sandstone post 36 by 6 by 6 inches, set 36 inches in the ground, having a copper bolt cemented in its top.

Resident referee: President of the school of the Church of God.

KENTON, HARDIN COUNTY.

Location of station: In southeast part of public school yard.

Station mark: A sandstone post 36 by 7 by 7 inches, set 32 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference marks: Thirty feet north of south fence and 18 feet from east fence and 36 feet from southeast corner of school yard.

Distant mark: North of station 315 feet, a sandstone post 30 by 6 by 6 inches, set 30 inches in the ground, having a copper bolt cemented in its top.

Resident referee: President of school board.

MARYSVILLE, UNION COUNTY.

Location of station: On church lot, 9 feet northeast of the northeast corner of Methodist church.

Station mark: A sandstone post 36 by 6 by 6 inches, set 34 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference marks: Twenty-seven feet from corner of street.

Distant mark: In the court house grounds, north of station 375 feet, a sandstone post 30 by 6 by 6 inches, set 28 inches in the ground, having a copper bolt cemented in its top.

Resident referee: County clerk.

UPPER SANDUSKY, WYANDOT COUNTY.

Location of station: In southeastern part of public school grounds, 10 feet north of sidewalk.

Station mark: A limestone post 36 by 7 by 7 inches, set 34 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference marks: A white oak tree, 30 inches in diameter, bears N. 30 E., distant 48 feet.

Distant mark: North of station 348 feet, a limestone post 30 by 5 by 5 inches, set 30 inches in the ground, having a copper bolt cemented in its top.

Resident referees: School board.

WASHINGTON COURT HOUSE, FAYETTE COUNTY.

Location of station: Two feet from curb line on north side of Temple street, in school house yard.

Station mark: A limestone post 36 by 8 by 8 inches, set 33 inches in the ground, in the center of top of which is countersunk and cemented a bronze tablet.

Reference marks: A locust tree 20 inches in diameter, bears S. 80° W., distant 40 feet; bay window in new school house, bears N. 40° E., distant 171 feet.

Distant mark: Three hundred feet north of station, a limestone post 30 by 6 by 6 inches, set 30 inches in the ground, having a copper bolt cemented in its top.

Resident referee: County clerk.

APPENDIX H

ORGANIZATION AND PERSONNEL OF THE SURVEY.

ORGANIZATION.

The United States Geological Survey was organized originally to carry on work in geology, but it was found necessary to precede such work in a district with a topographic map, and from this necessity and other demands of extended character the topographic branch has grown to its present extensive organization and efficiency. Five branches constitute the Geological Survey, as follows:

Geologic Branch.

Topographic Branch.

Hydrographic Branch.

Publication Branch.

Administrative Branch.

The present work of surveying and mapping Ohio is carried on by the Topographic, Publication, and Administrative Branches.

The Topographic Branch is divided into the following four divisions:

Division of Triangulation, having charge of primary control.

Division of Topography, having charge of the topographic surveying.

Office Work, comprising the drafting of the surveyed sheets.

Division of Geography and Forestry, at present doing no work in the State.

The expense of the work done in Ohio by this branch is shared equally by the State and Federal Bureau.

The Publication Branch is divided into—

Division of Illustrations.

Photographic Laboratory.

Editorial Division.

Division of Engraving and Printing.

By the last two divisions the work of editing, engraving and printing the maps is carried on, after they have been surveyed and drafted. The expense of the work done by these two divisions on Ohio maps is borne entirely by the Federal Bureau.

The Administrative Branch has charge of disbursements and accounts and the other miscellaneous work of administration. The expense of the work on Ohio maps done by this branch is borne by the Federal Survey with the exception of about \$1,000 per year, withdrawn to cover expenses of general supervision of the work of the surveying parties during the field season.

For purposes of administration, the work of the Topographic Branch in 1901 was placed under section chiefs, the work in eastern Ohio being

allotted to the Atlantic Section of Topography, Mr. H. M. Wilson, geographer, in charge—and that of the flatter western and northwestern portion being assigned to the Central Section, Mr. J. H. Renshawe, geographer, in charge. In 1902 the work of the entire State was assigned to the Central Section of Topography. June 30, 1903, a reorganization of the Topographic Branch was effected by which the work of its administration was divided between two sections, the Eastern and Western, and Ohio was assigned to the Eastern Section of Topography, Mr. H. M. Wilson, geographer, in charge. Under the section chiefs the work is carried on by parties in charge of skilled assistants of the rank of topographer. A list of these and other permanent employees of the Survey, who have been engaged in Ohio work is given below. The work of the topographer requires considerable training and experience and these positions are filled by civil service examinations under government supervision. The subordinate positions, such as levelman, rodman, traverseman, etc., are filled by employing help temporarily in the localities under survey.

PERSONNEL OF SURVEY.

DIRECTOR

HONORABLE CHARLES D. WALCOTT.

SECTION CHIEFS

H. M. WILSON, Geographer, in charge of Eastern Section.

JOHN H. RENSHAW, Geographer, in charge of Central Section.

PRIMARY CONTROL.

S. S. GANNETT, Geographer, in charge of Division of Triangulation.

A. H. THOMPSON, geographer, ...	Division of Triangulation
W. T. GRISWOLD, topographer, ...	Division of Triangulation
GEO. T. HAWKINS, topographer, ...	Division of Triangulation
SLEDGE TATUM, topographer, ...	Division of Triangulation
E. L. MCNAIR, topographer, ...	Division of Triangulation
D. H. BALDWIN topographer, ...	Division of Triangulation
J. R. ELLIS, assistant topographer, ...	Division of Triangulation
C. B. KENDALL, field assistant, ...	Division of Triangulation

CONTOUR SKETCHING.

ANDERSON, C. G., field assistant.	HACKETT, MERRILL, topographer.
BEBB, E. C., topographer.	HALL, W. C., topographer.
BIRDSEYE, C. H., field assistant.	HANNEGAN, DUNCAN, topographer.
BLAIR, H. B., topographer.	JOHNSON, H. L., topographic aid.
BURKLAND, A. O., field assistant.	LLOYD, W. J., topographer.
COE, ROBERT, assistant topographer.	MCCOY, J. T., field assistant.
COOKE, C. E., topographer.	MANNING, VAN H., topographer.
CUMMIN, R. D., topographer.	MORRILL, W. N., topographer.
DUKE, BASIL, topographer.	MUNN, M. J., topographic aid.
GOODLOVE, C. W., topographer.	MUNROE, HERSEY, topographer.
GRIFFIN, W. H., topographer.	SADLER, C. L., assistant topographer.
GRISWOLD, W. T., topographer.	TYLER, NAT., JR., topographer.

